US Army Corps
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Walla Walla District

United States
Environmental Protection Agency
Region 10

DREDGED MATERIAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

McNary Reservoir and Lower Snake River Reservoirs

APPENDIX D
Upland Disposal Conceptual Design

FINAL
July 2002

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13. ABSTRACT *(Maximum 200 words)*

This final Dredged Material Management Plan/Environmental Impact Statement (DMMP/EIS) presents the Corps of Engineers' programmatic plan for maintenance of the authorized navigation channel and certain publicly owned facilities in the lower Snake River reservoirs between Lewiston, Idaho and the Columbia River, and McNary reservoir on the Columbia River for 20 years; for management of dredged material from these reservoirs; and for maintenance of flow conveyance capacity at the most upstream extent of the Lower Granite reservoir for the remaining economic life of the dam and reservoir project (to year 2074). The Corps, along with the U.S. Environmental Protection Agency, analyzed four alternatives for this Final DMMP/EIS: Alternative 1 - No Action (No Change) - Maintenance Dredging With In-Water Disposal; Alternative 2 - Maintenance Dredging With In-Water Disposal to Create Fish Habitat and a 3-Foot Levee Raise; Alternative 3 - Maintenance Dredging With Upland Disposal and a 3-Foot Levee Raise; and Alternative 4 - Maintenance Dredging With Beneficial Use of Dredged Material and a 3-Foot Levee Raise (Recommended Plan/Preferred Alternative).

14. SUBJECT TERMS
dredging, dredged material, navigation maintenance, flow conveyance, inland waterway, Lower Snake River, Ice Harbor Reservoir, Lower Monumental Reservoir, Little Goose Reservoir, Lower Granite Reservoir, McNary Reservoir, Lewiston levee system

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FINAL DREDGED MATERIAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT
McNary Reservoir and Lower Snake River Reservoirs

JULY 2002

ERRATA SHEET
FOR
APPENDIX D - UPLAND DISPOSAL

This appendix has not been substantially changed from the draft and will not be reprinted. Please make the following changes to the draft appendix and consider the draft appendix with corrections as the final appendix.

Front cover:
Apply the attached label (FINAL, July 2002) on the front cover to the right of the draft date.

Footnotes throughout the appendix:
Change all footnote references from "Draft DMMP/EIS, October 2001" to "Final DMMP/EIS, July 2002."

Page D-1 last paragraph, 4th sentence should read:
Conversely, leaving the levee system at the current elevation would require dredging more material to reduce the water levels in flood situations and reduce the risk that the levees are overtopped.

*** * * END OF CHANGES * * ***

DREDGED MATERIAL MANAGEMENT PLAN AND ENVIRONMENTAL IMPACT STATEMENT

McNARY RESERVOIR AND LOWER SNAKE RIVER RESERVOIRS

APPENDIX D

UPLAND DISPOSAL CONCEPTUAL DESIGN

prepared for

U.S. Army Corps of Engineers
Walla Walla District
201 N. 3rd Avenue
Walla Walla, WA 99362

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October 2001

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1.0 INTRODUCTION

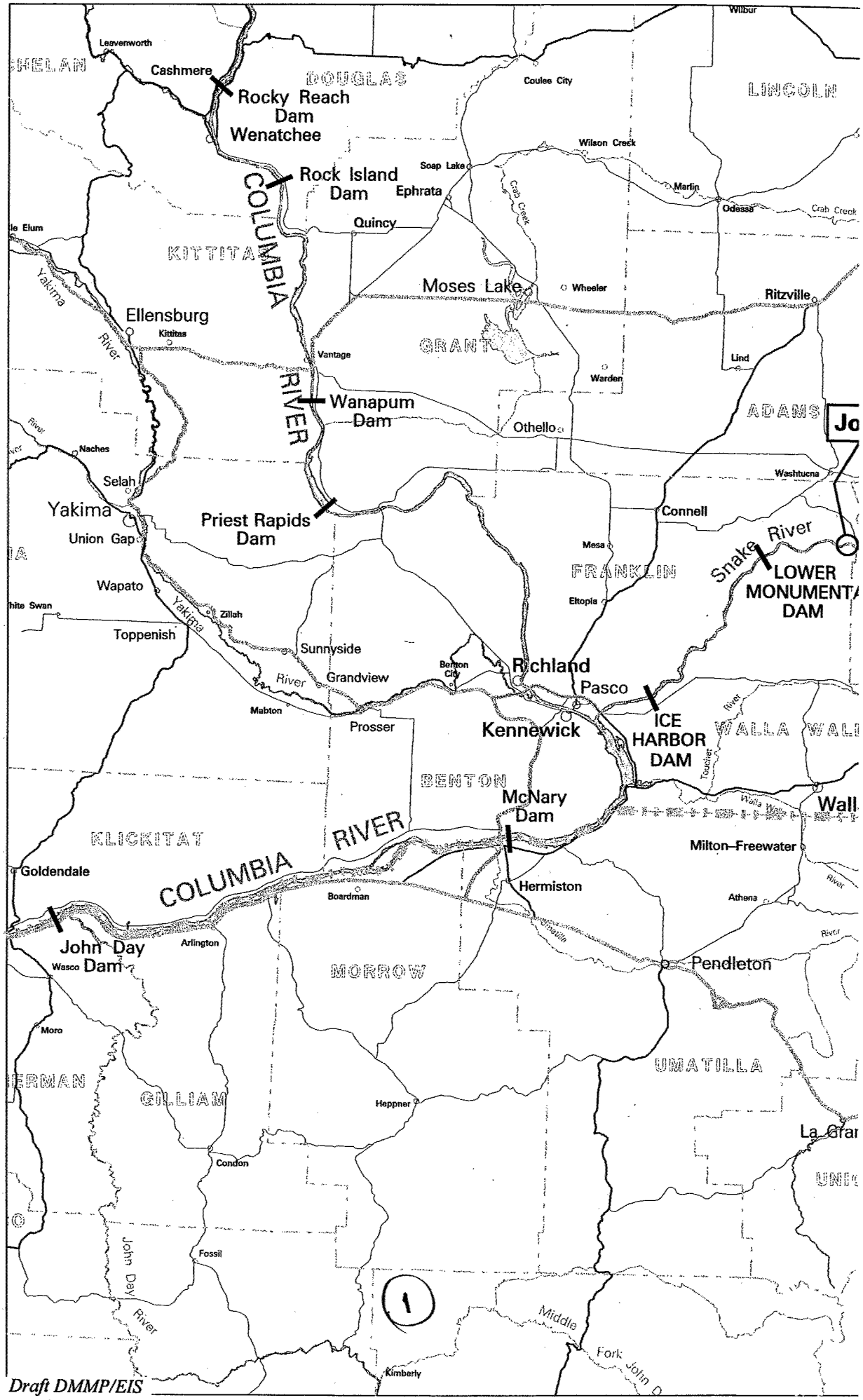
This report presents conceptual designs for upland dredged material disposal sites associated with dredging in five reservoirs on the lower Snake and Columbia Rivers. Included are site layouts, descriptions of major site features associated with the development of disposal facilities and operations, construction quantity estimates, and estimated costs.

1.1 Background

The Walla Walla District Corps of Engineers (Corps) is conducting a feasibility-level study to evaluate dredged material disposal requirements for the navigable waterways within its boundaries. The study reach considered includes five reservoirs: Ice Harbor, Lower Monumental, Little Goose, and Lower Granite reservoirs on the lower Snake River, spanning the region from Tri-Cities, Washington east to Lewiston, Idaho; and McNary reservoir on the Columbia River between Umatilla, Oregon, and Tri-Cities, Washington (figure D-1). These reservoirs are part of the Columbia/Snake Rivers inland navigation waterway, which provides slackwater navigation from the mouth of the Columbia River near Astoria, Oregon, to port facilities on the Snake and Clearwater Rivers at Lewiston, Idaho, and Clarkston, Washington. Each of these reservoirs has required some level of dredging to maintain the navigation channel at the minimum authorized depth of 14 feet [4.3 meters (m)]. The Corps is required to prepare a dredged material management plan for future dredging activities in accordance with Engineering Regulation (ER) 1105-2-100, *Planning Guidance Notebook.*

Lower Granite Lock and Dam (Lower Granite), the most upstream of the four lower Snake River dams, is the final link in the inland waterway system that provides slackwater navigation to the cities of Lewiston, Idaho, and Clarkston, Washington. The upper reach of the Lower Granite reservoir serves as a sediment trap for most of the material carried in suspension in the free-flowing reaches of the contributing rivers--the Salmon, Grande Ronde, and Imnaha Rivers; the main stem of the Clearwater River; and the local drainage of the Snake river between the Hells Canyon complex and Lower Granite. The quantity of sediment that collects in the Lower Granite reservoir far exceeds the quantities observed in each of the other lower Snake River reservoirs and in the McNary reservoir.

The project addressed in the study would provide for the maintenance of navigation and flood flow conveyance. Many of the alternatives considered included either dredging and/or raising existing levees as features. Raising the height of the backwater levee system would allow a reduction in the quantity of material dredged to provide flow conveyance. Conversely, leaving the levee system at the current elevation would require dredging more material to reduce the water levels in flood situations and ensure the levees are not overtopped. The existing levee system protects the business district of Lewiston, Idaho. Over the years since the reservoir was filled in 1975, collecting sedimentation has reduced the channel capacity, causing the computed water surface elevations associated with a particular discharge to rise. During the first 12 years of operation, the average annual reduction in levee freeboard was 0.25 foot (0.08 m) per year. Projections indicate that, without corrective action, the standard project flood could overtop the existing levees by the year 2075. To correct this condition, a levee raise and/or dredging are being considered.



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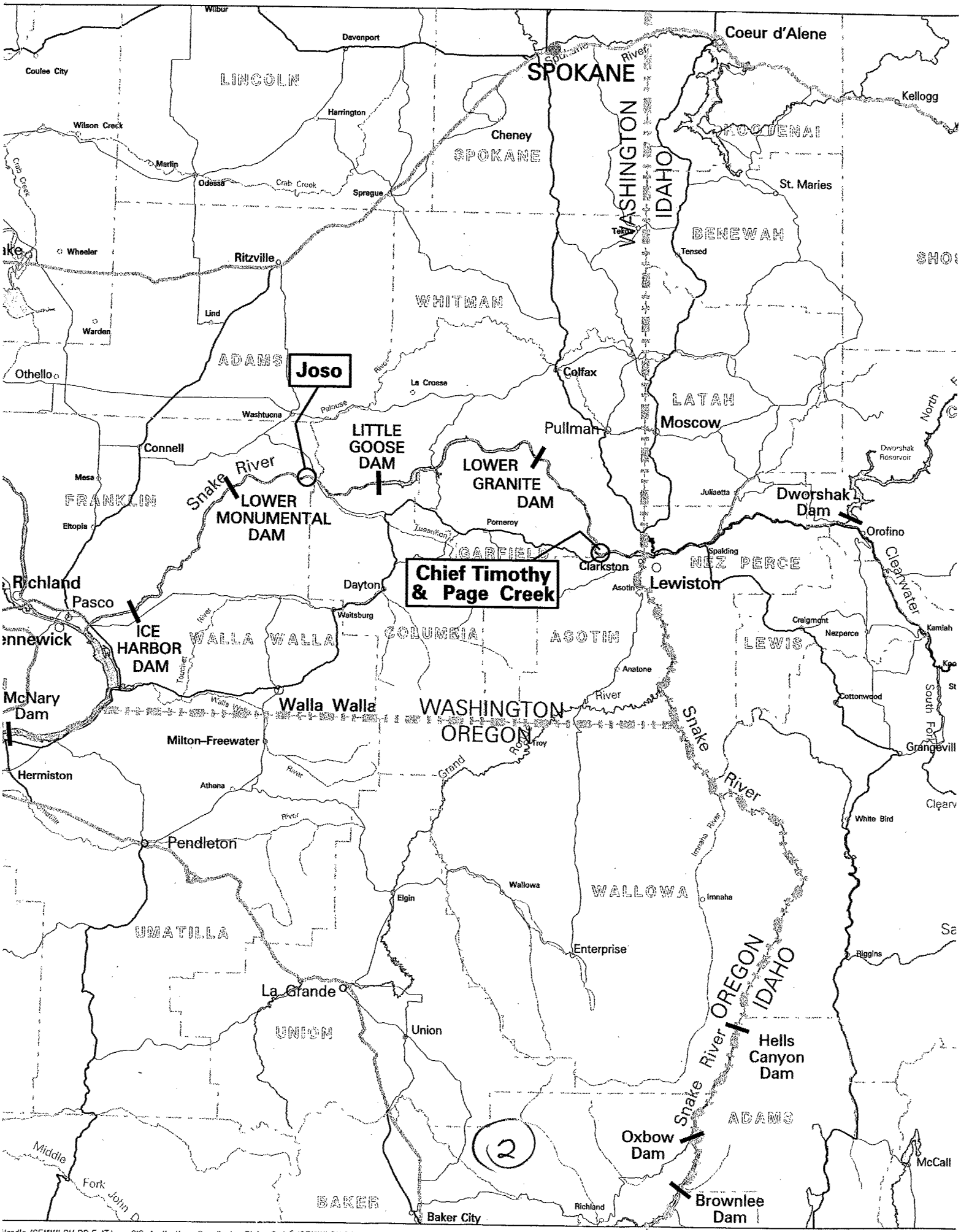

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Hardin (CENWW-PM-PD-E-AT) GIS Applications Coordinator: Blaise Grdeń (CENWW-PM-PD-E-AT) Study Manager: Blaise Grdeń (CENWW-PM-PD-E-AT)

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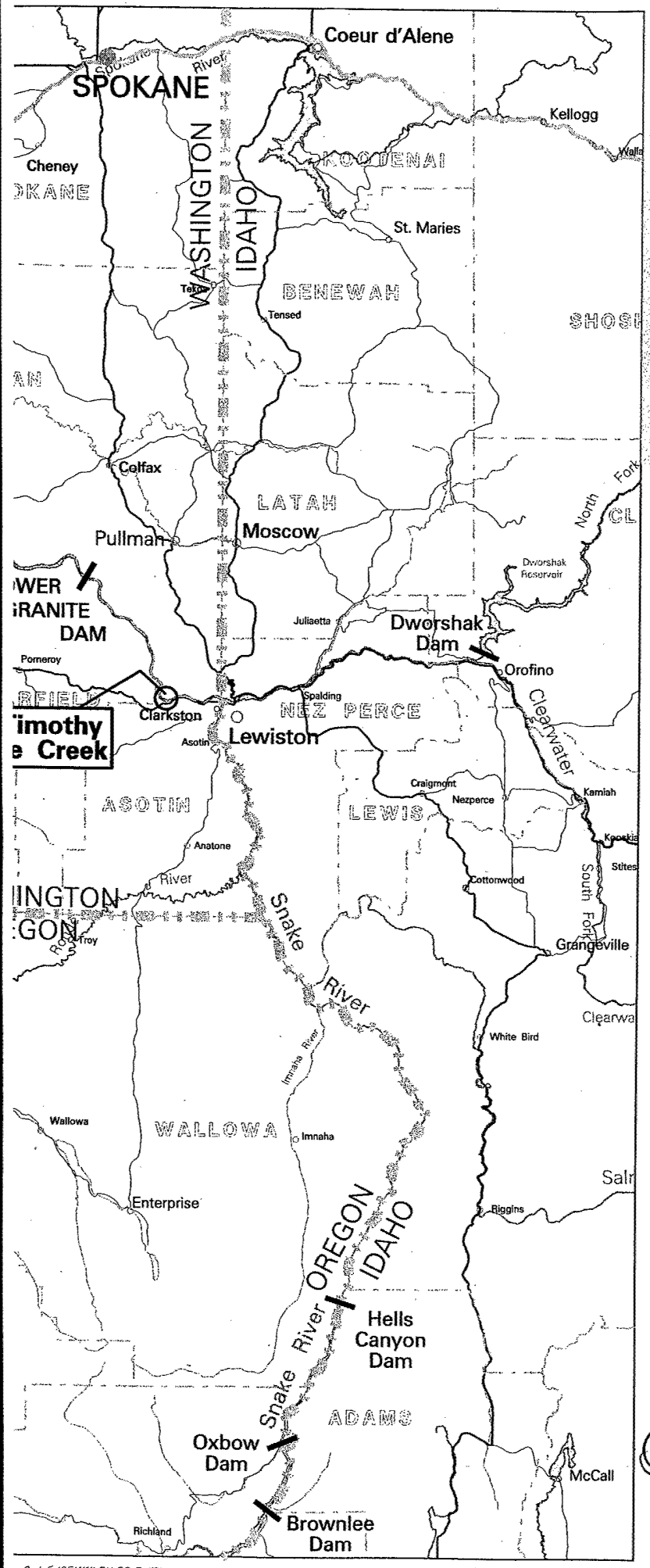

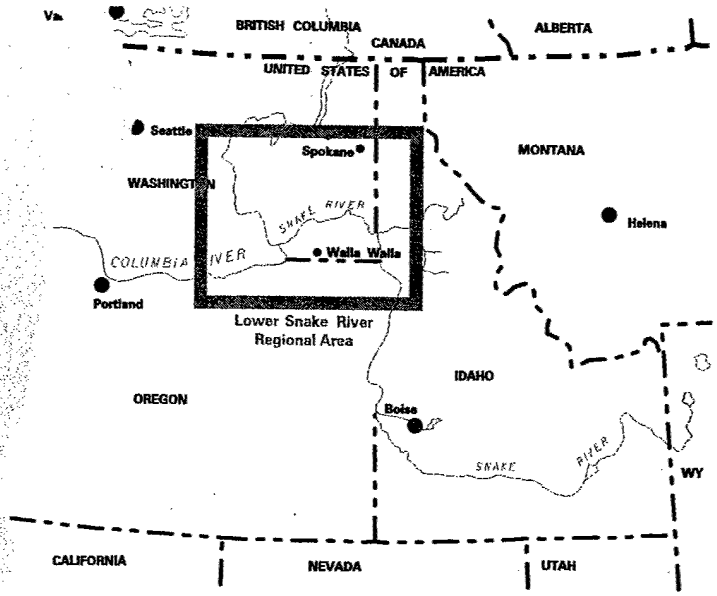

Appendix
Upland Disposal Conceptual Desig

BOUNDARIES

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County

HIGHWAYS

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Walla Walla District

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McNary Reservoir and Lower Snake River Reservoirs
Dredged Material Management Plan

Upland Disposal Sites

1999

FIGURE D–1

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D-2

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To comply with the requirements of ER 1105-2-100 and to properly manage the resources within its jurisdiction, the Corps is conducting a multi-year study, the Dredged Material Management Study (DMMS), and preparing a programmatic document, the Dredged Material Management Plan/Environmental Impact Statement (DMMP/EIS). The DMMP/EIS will select a plan of action that is within the authority of the Corps to perform. The Corps initiated the DMMS in October 1997 and is projected to complete the DMMS and the DMMP/EIS by September 30, 2002.

The DMMS has included a number of components. The Corps conducted scoping meetings for the DMMS in September 1998. The Corps identified possible upland disposal sites for dredged material and conducted an analysis to select a preferred and an alternate site for each of the five reservoirs. Corps hydrologists identified portions of the reservoirs where sediment has been accumulating. Corps hydrologists and fish biologists identified potential in-water disposal areas. Additional economic and engineering analyses were performed.

1.2 Dredging Alternatives

The Corps has conducted an analysis of alternatives that potentially address the need to maintain navigation and provide enhanced conveyance in the Lewiston area. The alternatives (presented in table D-1) represent a range of scenarios that are defined by raising levees and/or dredging, and by disposal method (upland or in-water). Additionally, dredging alternatives that simply maintain the existing navigation channel in the study area were included.

Table D-1. Alternatives Considered.

Alternative	Levee Raise [feet (meters)]	Nominal Dredge Volume	Disposal Method
1a	0 (0)	Navigation only	In-water
1b	0 (0)	Navigation only	Upland
2a	12 (3.7)	Navigation only	In-Water
2b	12 (3.7)	Navigation only	Upland
3a	8 (2.4)	300,000 cubic yards (CY) [229,367 cubic meters (m^3)/yr	In-Water
3b	8 (2.4)	300,000 CY (229,367 m^3)/yr	Upland
4a	4 (1.2)	1,000,000 CY (764,555 m^3) /yr	In-Water
4b	4 (1.2)	1,000,000 CY (764,555 m^3)/yr	Upland
5a	3 (0.9)	1,000,000 CY (764,555 m^3)/yr	In-Water
5b	3 (0.9)	1,000,000 CY (764,555 m^3)/yr	Upland
6a	0 (0)	2,000,000 CY (1,529,110 m^3)/yr	In-Water
6b	0 (0)	2,000,000 CY (1,529,110 m^3)/yr	Upland

This appendix considers the upland disposal aspect of the dredging alternatives. After a screening process, some features of these alternatives were combined to carry forward into Section 2.5, Alternatives Selected for Further Consideration, of the DMMP/EIS. Costs for the

Dredging Program/Upland Disposal combinations were developed and used in the Benefit Cost Analysis presented in Appendix C, Economic Analysis.

1.3 Dredged Material Quantities

The Corps developed estimates of dredged material quantities for each alternative. These quantity estimates were prepared for a time period from year 1 (or the project beginning) to year 74 (or the project end). These estimates are presented in tables D-2 and D-3.

Table D-2. Dredged Material Quantities from Lower Granite Reservoir.

Year	ALTERNATIVE					
	1a & 1b	2a & 2b	3a & 3b	4a & 4b	5a & 5b	6a & 6b
1			300,000 CY (229,367 m^3)	1,000,000 CY (764,555 m^3)	1,000,000 CY (764,555 m^3)	2,000,000 CY (1,529,302 m^3)
2			300,000 CY (229,367 m^3)	1,000,000 CY (764,555 m^3)	1,000,000 CY (764,555 m^3)	2,000,000 CY (1,529,302 m^3)
3			300,000 CY (229,367 m^3)	1,000,000 CY (764,555 m^3)	1,000,000 CY (764,555 m^3)	2,000,000 CY (1,529,302 m^3)
4			300,000 CY (229,367 m^3)	1,000,000 CY (764,555 m^3)	1,000,000 CY (764,555 m^3)	2,000,000 CY (1,529,302 m^3)
5	41,500 CY (31,729 m^3)	41,500 CY (31,729 m^3)	300,000 CY (229,367 m^3)	1,000,000 CY (764,555 m^3)	1,000,000 CY (764,555 m^3)	2,000,000 CY (1,529,302 m^3)
6			300,000 CY (229,367 m^3)	1,000,000 CY (764,555 m^3)	1,000,000 CY (764,555 m^3)	2,000,000 CY (1,529,302 m^3)
7			300,000 CY (229,367 m^3)	1,000,000 CY (764,555 m^3)	1,000,000 CY (764,555 m^3)	2,000,000 CY (1,529,302 m^3)
8			300,000 CY (229,367 m^3)	1,000,000 CY (764,555 m^3)	1,000,000 CY (764,555 m^3)	2,000,000 CY (1,529,302 m^3)
9			300,000 CY (229,367 m^3)	1,000,000 CY (764,555 m^3)	1,000,000 CY (764,555 m^3)	2,000,000 CY (1,529,302 m^3)
10	41,500 CY (31,729 m^3)	41,500 CY (31,729 m^3)	300,000 CY (229,367 m^3)	1,000,000 CY (764,555 m^3)	1,000,000 CY (764,555 m^3)	2,000,000 CY (1,529,302 m^3)
11			300,000 CY (229,367 m^3)	325,000 CY (248,480 m^3)	325,000 CY (248,480 m^3)	2,000,000 CY (1,529,302 m^3)
12			300,000 CY (229,367 m^3)	325,000 CY (248,480 m^3)	325,000 CY (248,480 m^3)	2,000,000 CY (1,529,302 m^3)
13			300,000 CY (229,367 m^3)	325,000 CY (248,480 m^3)	325,000 CY (248,480 m^3)	2,000,000 CY (1,529,302 m^3)
14			300,000 CY (229,367 m^3)	325,000 CY (248,480 m^3)	325,000 CY (248,480 m^3)	2,000,000 CY (1,529,302 m^3)
15			300,000 CY (229,367 m^3)	325,000 CY (248,480 m^3)	325,000 CY (248,480 m^3)	2,000,000 CY (1,529,302 m^3)
16			300,000 CY (229,367 m^3)	325,000 CY (248,480 m^3)	325,000 CY (248,480 m^3)	2,000,000 CY (1,529,302 m^3)
17			300,000 CY (229,367 m^3)	325,000 CY (248,480 m^3)	325,000 CY (248,480 m^3)	2,000,000 CY (1,529,302 m^3)
18			300,000 CY (229,367 m^3)	325,000 CY (248,480 m^3)	325,000 CY (248,480 m^3)	2,000,000 CY (1,529,302 m^3)
19			300,000 CY (229,367 m^3)	325,000 CY (248,480 m^3)	325,000 CY (248,480 m^3)	2,000,000 CY (1,529,302 m^3)
20	50,000 CY (38,228 m^3)	50,000 CY (38,228 m^3)	300,000 CY (229,367 m^3)	325,000 CY (248,480 m^3)	325,000 CY (248,480 m^3)	2,000,000 CY (1,529,302 m^3)
21-74	50,000 CY (38,228 m^3) @ 10-year intervals	50,000 CY (38,228 m^3) @ 10-year intervals	300,000 CY (229,367 m^3)	325,000 CY (248,480 m^3)	325,000 CY (248,480 m^3)	725,000 CY (554,302 m^3)

Table D-3. Dredged Material Quantities from Lower Reservoirs.

Year	RESERVOIR			
	McNary	Ice Harbor	Lower Monumental	Little Goose
1	32,000 CY (24,466 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)
2				
3	32,000 CY (24,466 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)
4				
5	32,000 CY (24,466 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)
6				
7	32,000 CY (24,466 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)
8				
9	32,000 CY (24,466 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)
10				
11	32,000 CY (24,466 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)
12				
13	32,000 CY (24,466 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)
14				
15	32,000 CY (24,466 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)
16				
17	32,000 CY (24,466 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)
18				
19	32,000 CY (24,466 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)	2,000 CY (1,529 m^3)
20				
21-74	32,000 CY (24,466 m^3) @ 2-year intervals	2,000 CY (1,529 m^3) @ 2-year intervals	2,000 CY (1,529 m^3) @ 2-year intervals	2,000 CY (1,529 m^3) @ 2-year intervals

2.0 DREDGED MATERIAL DISPOSAL SITES

The disposal of all dredged material at upland sites will occur for 6 of the 12 dredging alternatives (1b, 2b, 3b, 4b, 5b, and 6b). The upland sites include the Joso site, located on the Snake River between River Mile (RM) 56.5 and RM 56.8, and the Page Creek site, located approximately 1 1/2 miles [2.4 kilometers (km)] east of the Snake River at Silcott. The Page

Creek site would utilize a transfer site, the Chief Timothy site, which would be located on the Snake River near Silcott at the mouth of Alpowa Creek. For the in-water disposal alternatives (1a, 2a, 3a, 4a, 5a, and 6a) a contingency disposal site for marginally contaminated material would be located at the Joso site. The locations of the disposal sites are shown on figure D-1.

Conceptual designs for the upland sites were developed for each appropriate dredging alternative. Construction material quantities were then estimated for each site, and these quantity estimates were utilized in developing cost estimates for each dredging alternative.

2.1 Upland Disposal Site Conceptual Design

The development of the upland disposal concepts was based on the following criteria and assumptions:

2.1.1 Dredged Material Assumptions

Dredged material characteristics that affect the upland disposal site concepts include:

- Dredged material will include silts and free water, requiring dewatering for a 2-week period at the location where the material is off-loaded from barges prior to transfer to trucks for transport to the disposal areas or for movement to a storage pile.
- Small amounts of marginally contaminated material may be encountered during dredging; this material will require disposal at a dedicated site (Joso).

2.1.2 Dredging Operational Assumptions

The assumed characteristics of the dredging operations that impact the upland site concepts include:

- Dredging operations will be limited to the period between December 15 and March 1, which will equal 75 working days.
- Dredging operations will occur throughout an entire 24-hour day.
- Dredging operations will utilize a clamshell to load dredged material onto barges for transport to the disposal or transfer sites.

2.1.3 Upland Disposal Site Design Criteria Assumptions

The disposal site concepts are based on the following basic design criteria:

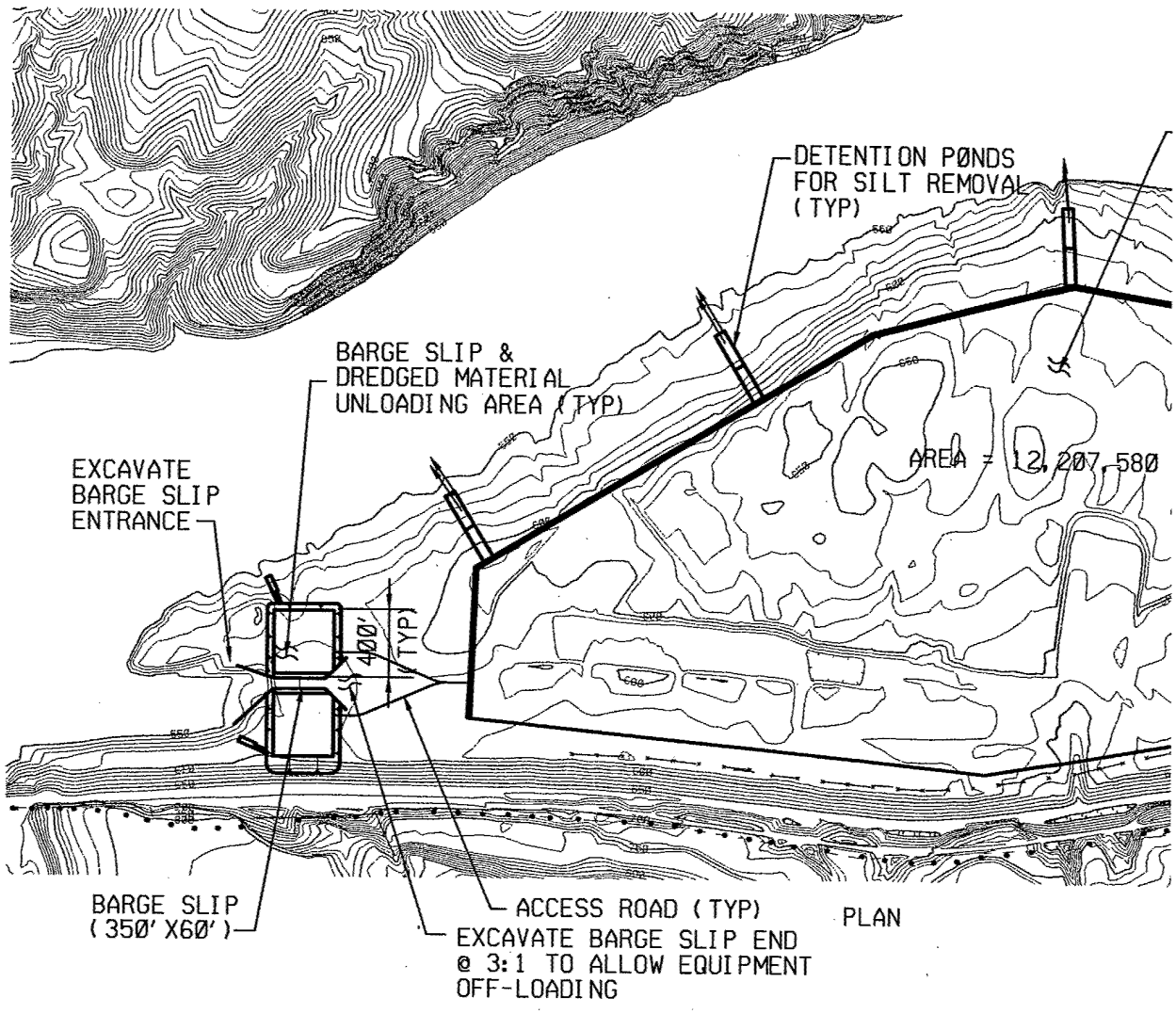
- Dredged material will be placed by constructing lifts and spreading and compacting material with tracked vehicles and steel wheeled compactors, resulting in structural fills.

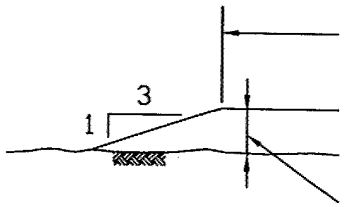
- Fill development will occur in stages, conforming to the final topography established in the design.
- The development of the final site topography and site layout will be based on the estimated quantity of material to be dredged and disposed of during the initial 20-year project period.
- Maximum slopes for fills will be 3 horizontal to 1 vertical (3:1).
- Site access roads will accommodate large trucks with maximum grades of 6 percent and minimum turning radii of 75 feet (22.9 m).
- Site drainage controls will meet appropriate federal, state, and county regulations and guidelines.
- Stormwater conveyance facilities will be sized to handle a 25-year, 24-hour storm event.
- Sedimentation/settling basins will be provided and will include two cells: a pre-settling basin and a final settling basin.
- Containment berms will be provided around fill areas to prevent uncontrolled discharge of sediment and silt.
- Site restoration will be achieved by re-establishing vegetation similar to the plant species present in surrounding areas.
- Site restoration will be achieved by placing 6 inches [15.2 centimeters (cm)] of topsoil on final slopes, re-seeding the area as part of a continuing restoration program, and installing a temporary irrigation system to establish vegetation growth as needed.

2.2 Joso Upland Disposal Site Conceptual Design

The Joso site will be the location for upland disposal of dredged material from the Granite Pool in alternatives 1b, 2b and 3b, and from the lower pools in alternatives 1b, 2b, 3b, 4b, 5b, and 6b (figure D-2). The Joso site is located along the southern shore of the Snake River between RM 56.5 and RM 58.6. The Union Pacific Railroad bounds the site on the southern side. The entire site is approximately 568 acres (229.9 hectares), with open space being the present use. A small portion of the site near the center has been used in the past for gravel extraction.

The area at the site available for dredged material disposal is constrained by a habitat area approximately 600 feet (182.9 m) wide along the entire Snake River site boundary and by wetlands in the eastern corner of the site. With these areas eliminated and by providing for barge slips and material unloading areas, an area of approximately 280 acres (113.3 hectares) has been defined as the location for permanent disposal of dredged material.





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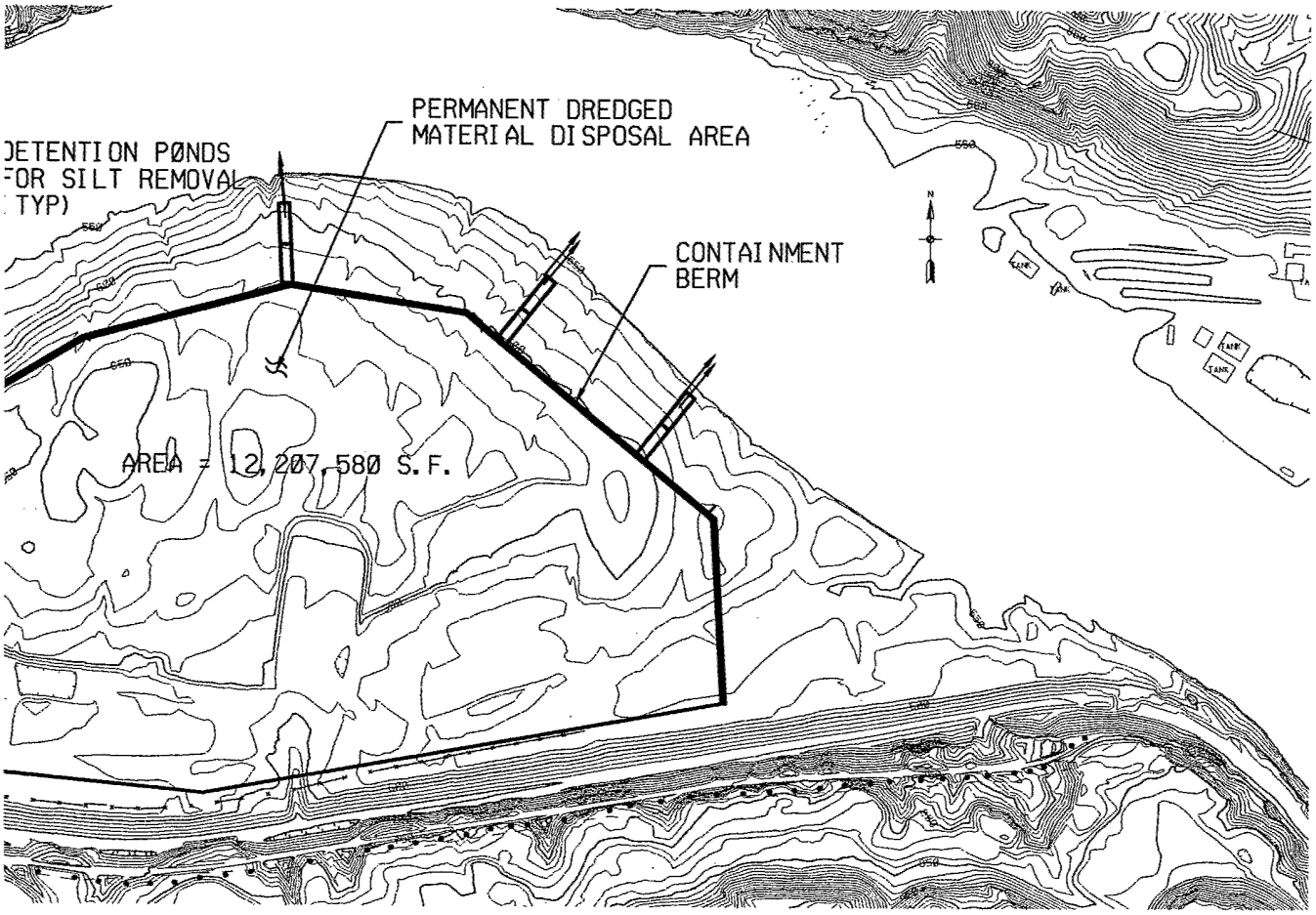

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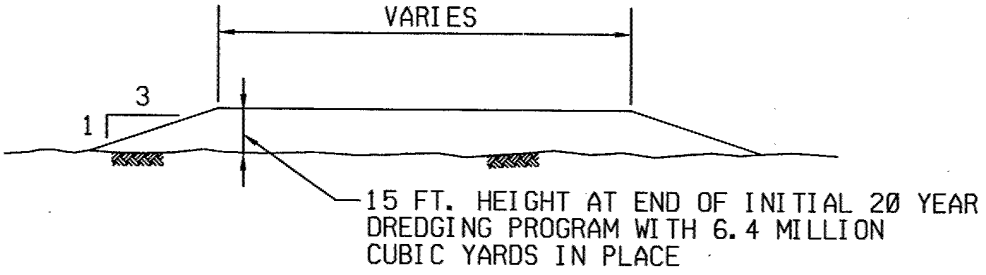

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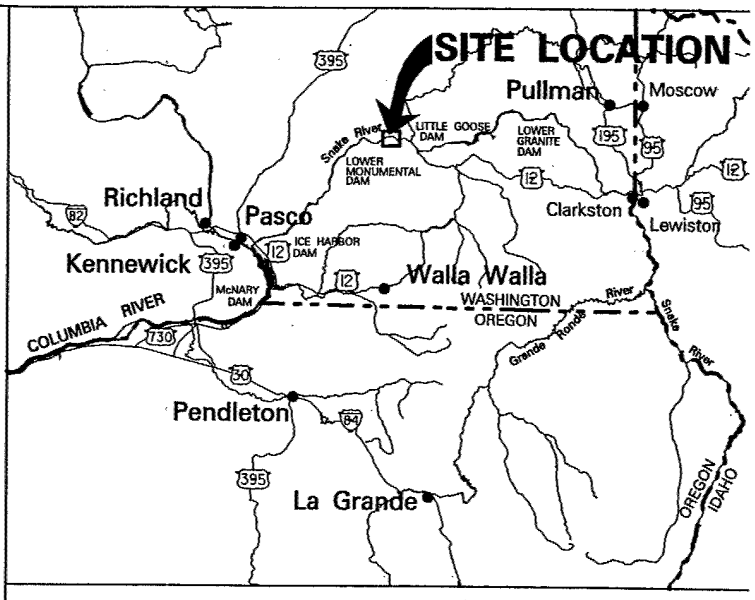

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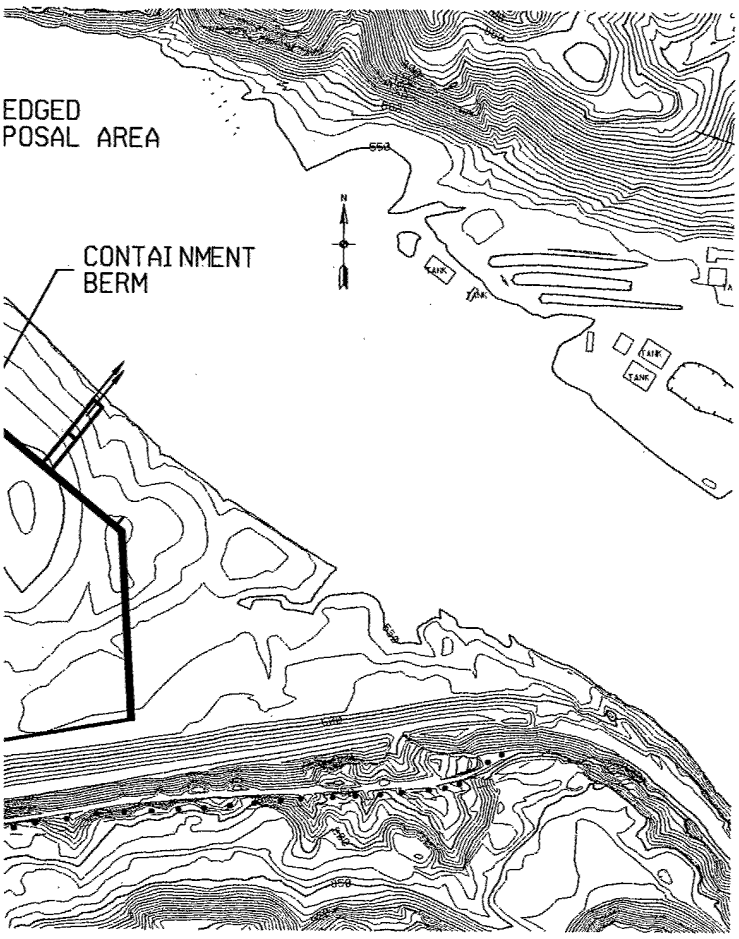
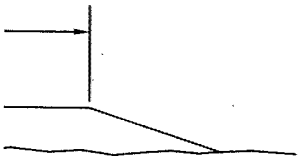




HT AT END OF INITIAL 20 YEAR
)GRAM WITH 6.4 MILLION
IN PLACE

Appendix 1
Upland Disposal Conceptual Desig

800 0 800 1600 FEET
1" = 800'

GEOGRAPHIC INFORMATION SYSTEMS
Corps of Engineers
Walla Walla District

DRAFT **McNary Reservoir and**
Lower Snake River Reservoirs
Dredged Material Management Plar

JOSO DREDGED MATERIAL
DISPOSAL SITE
SITE PLAN

D-8

1999

FIGURE D-

(3)

Barge access to the Joso site will be provided at the west end. The barge access will be constructed by excavating a slip approximately 60 feet (18.3 m) wide and 360 feet (109.7 m) long. Anchored sheetpile walls will be used along the barge slip sides to provide vertical wall docking surfaces and to retain the adjacent platform walls. Barge tie-offs will be constructed at the top of the slip adjacent to the sheet pile. Temporary dredged material storage areas will be developed adjacent to the slip to place material and allow for dewatering. These temporary storage areas will have containment berms constructed around their perimeter and will have detention pond systems for sediment removal from surface water prior to discharge to the Snake River. The containment berms will be constructed of on-site material and will be about 3 feet (0.9 m) high with 2:1 side slopes. They will be covered with geotextile to prevent erosion and reduce permeability, and will then be covered with 6 inches (15.2 cm) of topsoil and seeded.

The area in which dredged material will be placed will have a containment berm constructed around the north, east, and west perimeters similar to that described for the dredged material temporary storage areas. Detention ponds for silt removal from runoff will be provided at five locations around the perimeter adjacent to the Snake River. Dedicated access roads will be constructed between the temporary dredged material storage areas and the permanent disposal area.

Material handling at the Joso site will include off-loading of dredged material from the barges using cranes mounted on rubber tires. The material will be placed in the temporary storage areas adjacent to the barge slips for dewatering and loading onto trucks for transport into the disposal area. The material will then be placed in lifts with track-type tractors and compacted, resulting in a large structural fill conforming to the established final topography for the disposal area. Areas that reach final grades will be restored on a periodic basis by placing 6 inches (15.2 cm) of topsoil and re-seeding to achieve a vegetative cover similar to surrounding site areas. Silt removed by the detention ponds will be removed from the ponds following major storm events and periodically throughout the year and placed in the dredged material disposal fill. Dredged material will be delivered to the site from December 15 to March 1. Haul and disposal of material in the fill can take place throughout the year. The fill will have side slopes of 3:1 and an elevation of 15 feet above original ground surface at the end of the initial 20-year project period for alternative 3b, the alternative for which the largest amount of material will be placed at the site [6,400,000 CY (4,893,151 m^3)]. A conceptual site layout for the Joso site is presented in figure D-2.

2.3 Joso Contingency Upland Disposal Site Conceptual Design

Some dredged material may not be suitable for in-water disposal in options 1a, 2a, 3a, 4a, 5a, and 6a and will require upland disposal. A maximum of about 75,000 CY (57,341.6 m^3) of unsuitable material may be expected each year, with as much as 40,000 CY (30,582.2 m^3) containing contaminants below regulatory action levels. To address this possibility, a gravel pit at the Joso site has been identified as the contingency upland disposal site.

As mentioned earlier, the Joso site is located along the southern shore of the Snake River between RM 56.5 and RM 58.6. A 600-foot- (182.9-m-) wide habitat area bounds the site to the north and the Union Pacific Railroad bounds it on the south. The entire site is approximately

568 acres (229.9 hectares), with open space being the present use. About 20 percent of the site has been used in the past for gravel borrow.

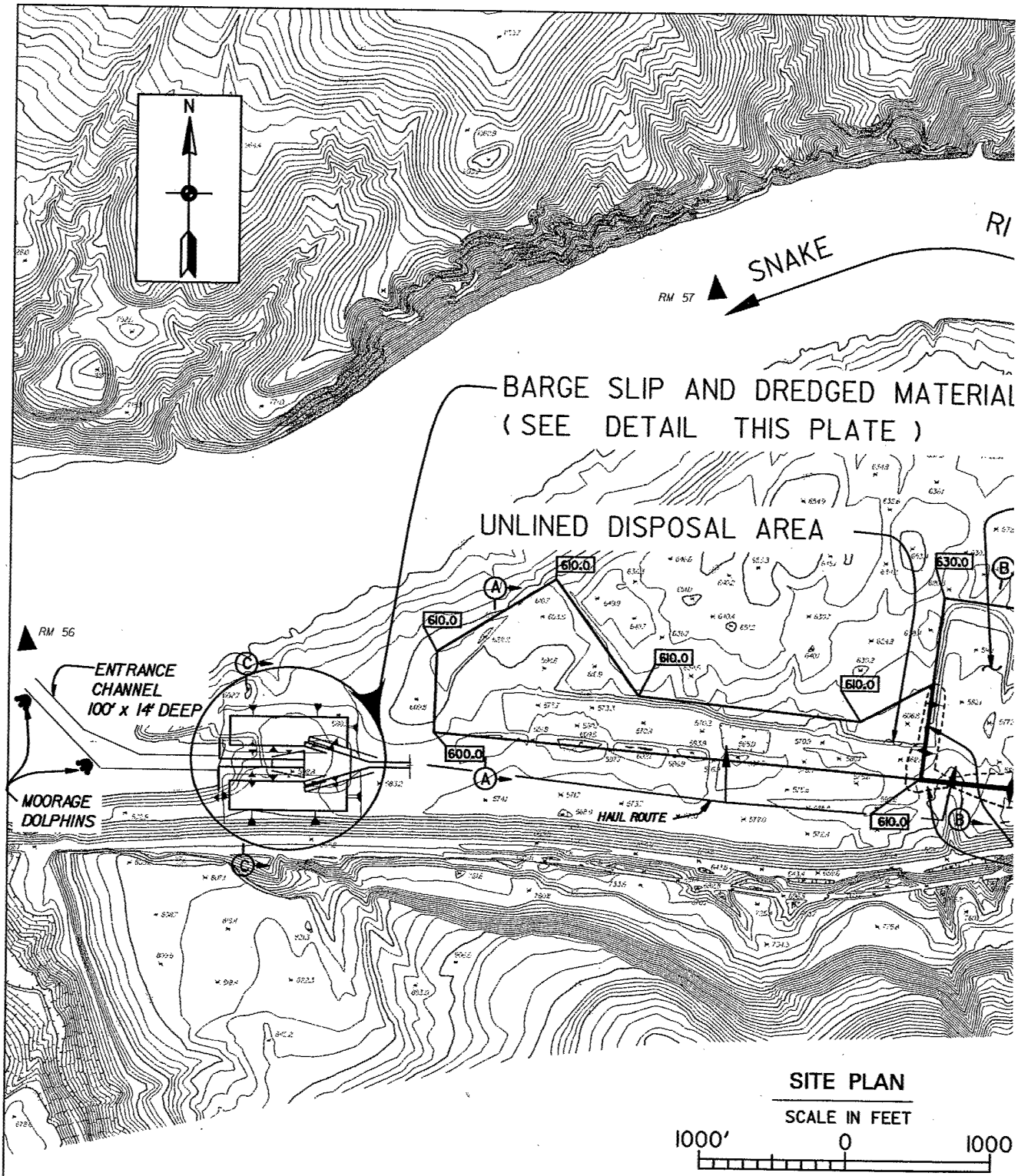
Dredged material disposal will be confined to the limits of the existing gravel pit. The gravel pit is located at the center of the site and includes about 80 acres (32.4 hectares). The pit area will be separated for two types of material disposal. About one-fourth of the pit will be lined for storage of contaminated material. This area will be located near the borrow pit center. Disposal of other dredged material will occur in the areas east and west of the lined area. A conceptual site layout for the Joso site is presented in figure D-2a.

The contaminated material disposal basin will utilize existing topography to the extent possible. Some excavation and shaping will be necessary at the north end of the basin. Containment berms will be required to completely enclose the basin. The berms will be 12 feet (3.7 m) wide at the crest and have 4:1 side slopes. Excavated slopes will be 2:1. The entire basin will be lined with a geomembrane overlain with fine-grained material and rock fill. Earth materials for berm construction will be obtained from required on-site excavation to the extent possible. A detention basin will be located at the south end for collecting surface runoff. Excess water from the detention basin will be routed to low ground between the south end of the pond and the existing railroad fill where it will be allowed to infiltrate the soils and/or evaporate.

Un-contaminated dredged material will be disposed of in the gravel pit on either side of the contaminated material basin. Disposal will begin at the north end of the pit and work south within the limits shown. The disposed material will be confined by high ground on the north side. A fill slope of 4:1 will be used at locations where the disposed material is unconfined. Surface runoff will be allowed to collect in the area between the disposed fill and the existing railroad fill where it will be allowed to infiltrate the soils and/or evaporate.

Dredged material and equipment will be brought to the site by barge. Barge access off-loading facilities will be provided at the west end of the Joso Site where a cove already exists. The off-loading facilities will be constructed inland from the water's edge to minimize disturbance to the shallow habitat provided by the cove to the extent possible. A 60-foot- (18.3-m-) wide by 360-foot- (109.7-m-) long barge slip will be constructed in the cove's east shore. The width was selected to match a typical barge width. Anchored sheetpile walls will be used along the barge slip sides to provide vertical wall docking surfaces and to retain the adjacent platform walls. Fill will be placed adjacent to the sheetpile walls to elevation 565.0 to form 50-foot- (15.2-m-) wide landings on either side of the slip for crane access. The landward end of the slip will be graded to allow equipment off-loading. Barge tie-offs will be constructed at the top of the slip adjacent to the sheet pile. Access to the slip will be provided by dredging a 100-foot- (30.5-m-) wide by 1,600-foot- (487.7-m-) long channel in the center of the cove to provide at least 14 feet (4.3 m) of depth. Channel side slopes will be angle of repose (about 4:1).

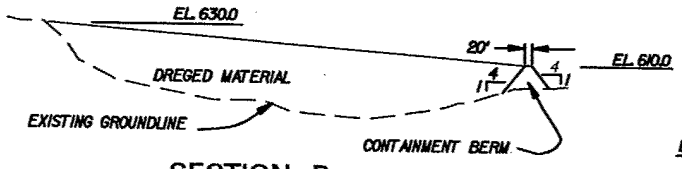
Two moorage dolphins will be installed along the entrance channel for temporary barge staging while awaiting unloading.



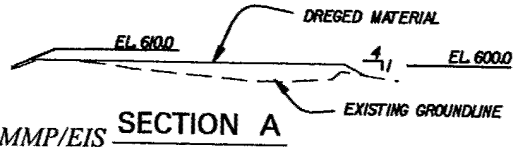
SITE PLAN

SCALE IN FEET

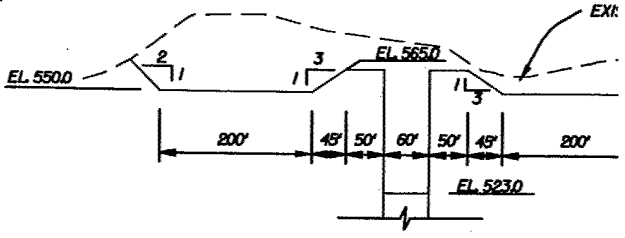
1000' 0 1000



SECTION B



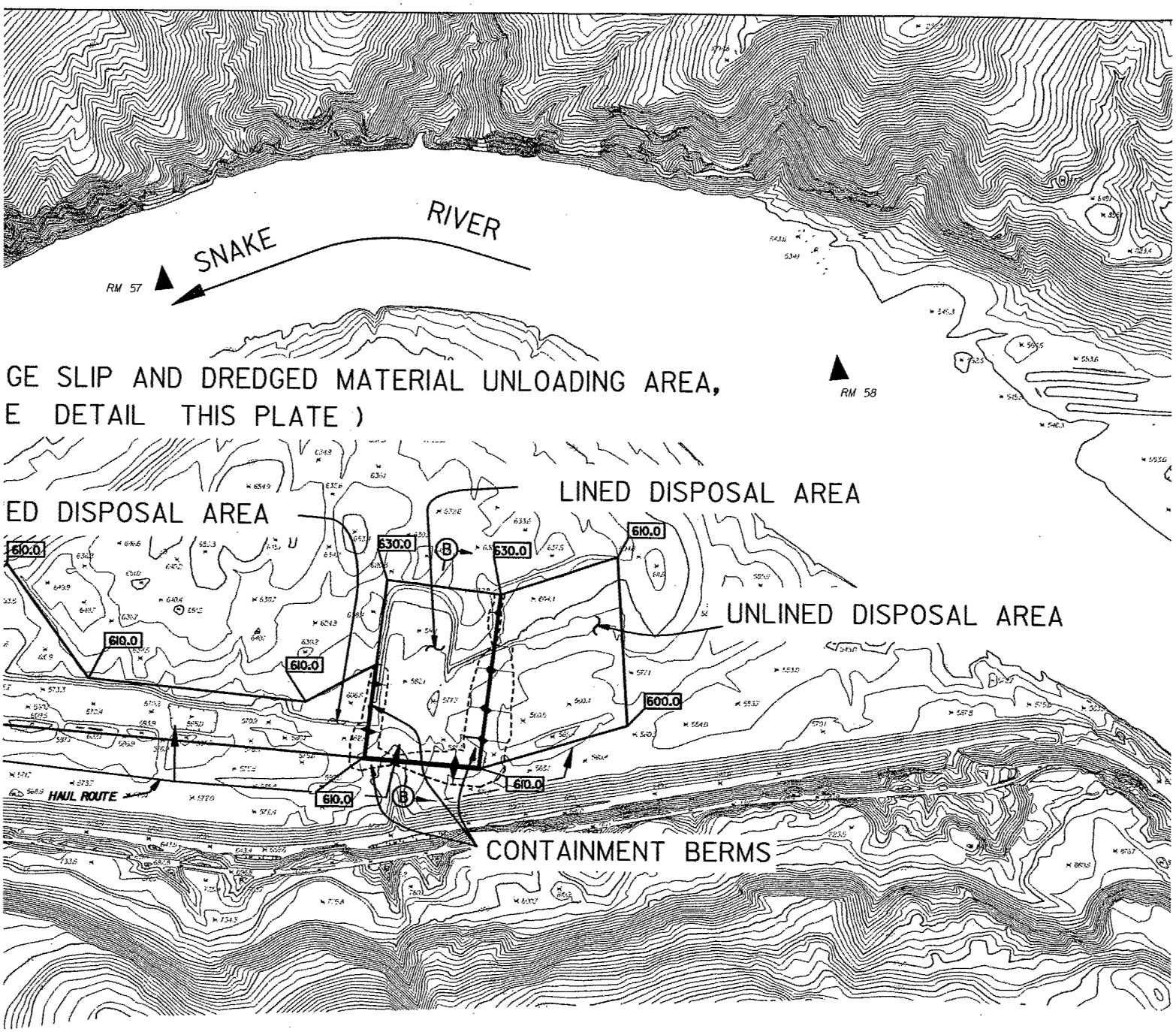
SECTION A



SECTION C

(1)

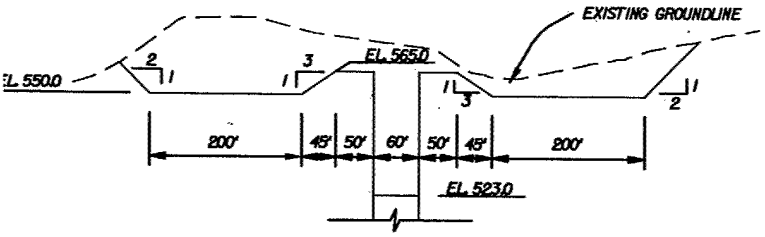
GIS Data Entry & Graphic Assembly: Applied Technology Team (CENWW-PM-PD-E-AT) GIS Conversion: George Hardin (CENWW-PM-PD-E-AT) GIS Applications Coordinator: Blaise Grden (CENWW-PM-PD-E-AT.



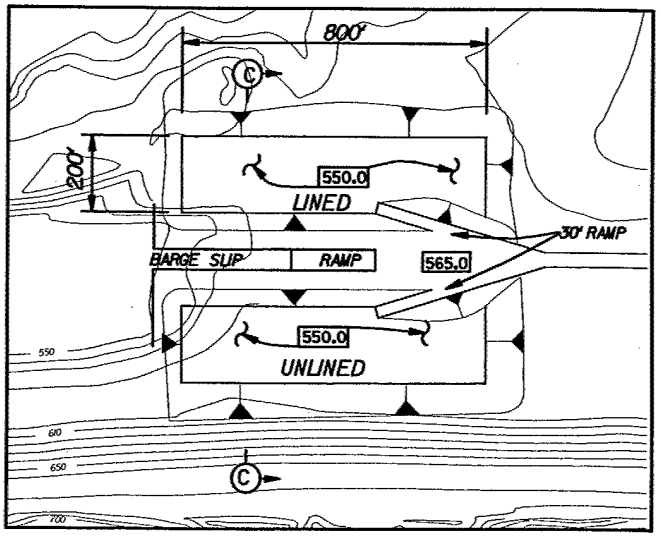
SITE PLAN

SCALE IN FEET

1000' 0 1000'



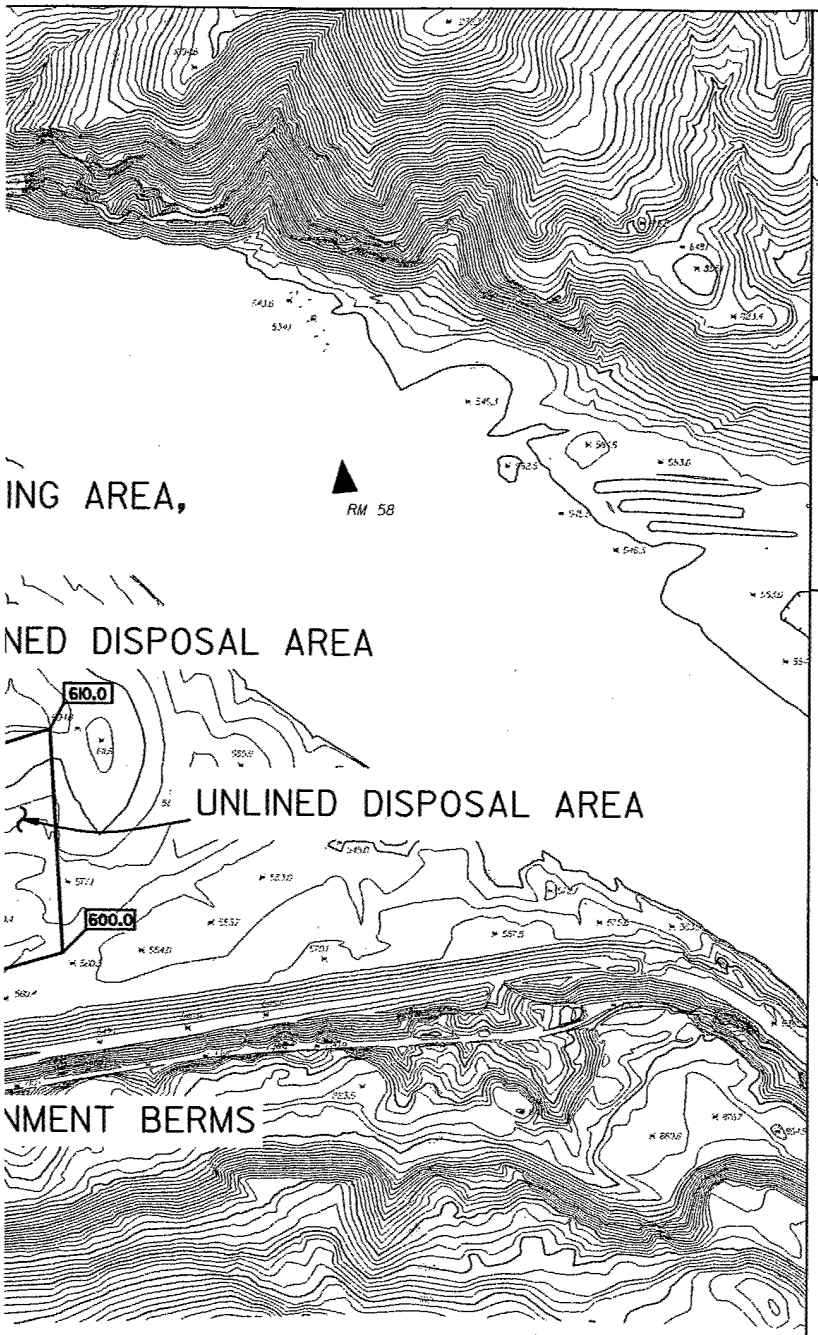
SECTION C

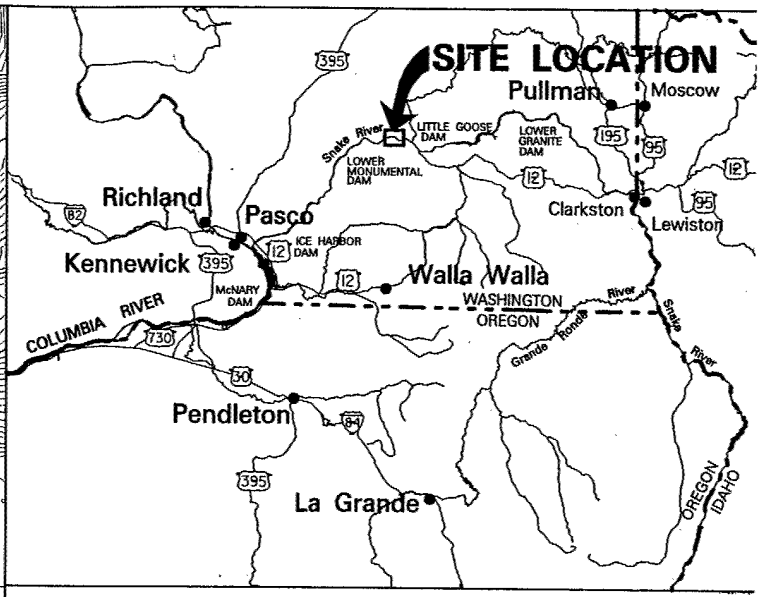


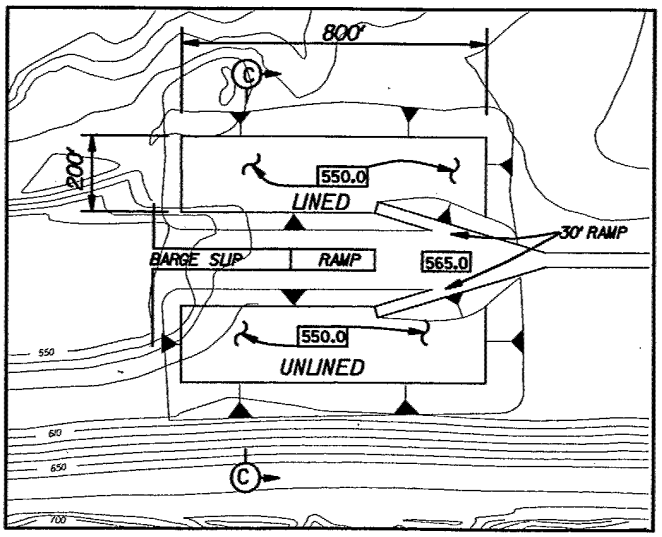
DETAIL – DISPOSAL UNLOADING AREA

SCALE - 1" = 500'

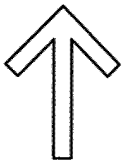
(2)

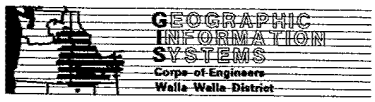






DETAIL – DISPOSAL UNLOADING AREA
SCALE - 1" = 500'





DRAFT

McNary Reservoir and Lower Snake River Reservoirs
Dredged Material Management Plan

JOSO CONTINGENCY DREDGED MATERIAL DISPOSAL SITE

D-11 CONCEPTUAL SITE PLAN

3

Two temporary dredged material storage areas will be developed adjacent to the slip to place material and allow for dewatering. One storage area will be for contaminated material and will be completely lined. The lined pond will utilize the same lining system as the permanent contaminated material disposal basin. The other storage area will be for uncontaminated silts. These temporary storage areas will have detention pond systems for sediment removal from surface water prior to discharge to the Snake River.

Material handling will be as previously described in the Joso Upland Disposal Site Conceptual Design. Dedicated access roads will be constructed between the temporary dredged material storage areas and the permanent disposal area. Areas that reach final grades will be restored on a periodic basis by placing 6 inches (15.2 cm) of topsoil and re-seeding to achieve a vegetative cover similar to surrounding site areas.

2.4 Chief Timothy Transfer Site Conceptual Design

The Chief Timothy site is located at the mouth of Alpowa Creek downstream of RM 130 on the Snake River. This site will serve as a transfer location for dredging alternatives 4b, 5b, and 6b, and may also be utilized for the period beyond the initial 20-year project period for alternative 3b. Material will be off-loaded from barges and temporarily stored at the site where it will be loaded onto trucks for transport to the upland disposal site at Page Creek. The transfer site is currently in the Snake River with an average water depth of about 21 feet (6.4 m).

The transfer and temporary storage facilities will be constructed by first building a rock berm around the site perimeter with side slopes of 2:1 and a top-of-berm elevation 3 feet above the river elevation. The total berm length will be approximately 7,156 feet (2,181.1 m). The area inside the perimeter berm will then be filled with dredged material to form a pad on which dredged material will be unloaded and temporarily stored in subsequent years.

The interior pad will be at an elevation about equal to the normal river elevation. The pad construction will require approximately 2,000,000 CY (1,529,110 m^3) of material and take about 2 years to construct for alternatives 4b and 5b, and 1 year to construct for alternative 6b. For the time period beyond the initial 20-year project period when the Chief Timothy site may be utilized for alternative 3b, it would require about 7 years to construct.

A containment berm will be constructed around the edge of the pad adjacent to the major berm to prevent sediment and runoff containing silt from leaving the site and draining into the Snake River. The containment berm will be 3 feet (0.9 m) high, constructed of available dredged material, covered with geotextile to prevent erosion, then covered with topsoil and seeded. Sediment and silt removal ponds will be constructed at the east and west ends of the pad and surface water on the pad will drain through the ponds prior to discharge to the Snake River. The pad will be surfaced with 1 foot (0.3 m) of roller-compacted concrete (RCC) to provide a working surface and minimize infiltration.

The unloading of dredged material at the Chief Timothy site will occur over a 75-day period, 24 hours per day. A barge berthing area will be developed along the entire north side of the site by driving sheet pile and placing mooring piles at 20-foot (6.1-m) centers. The sheet pile will be

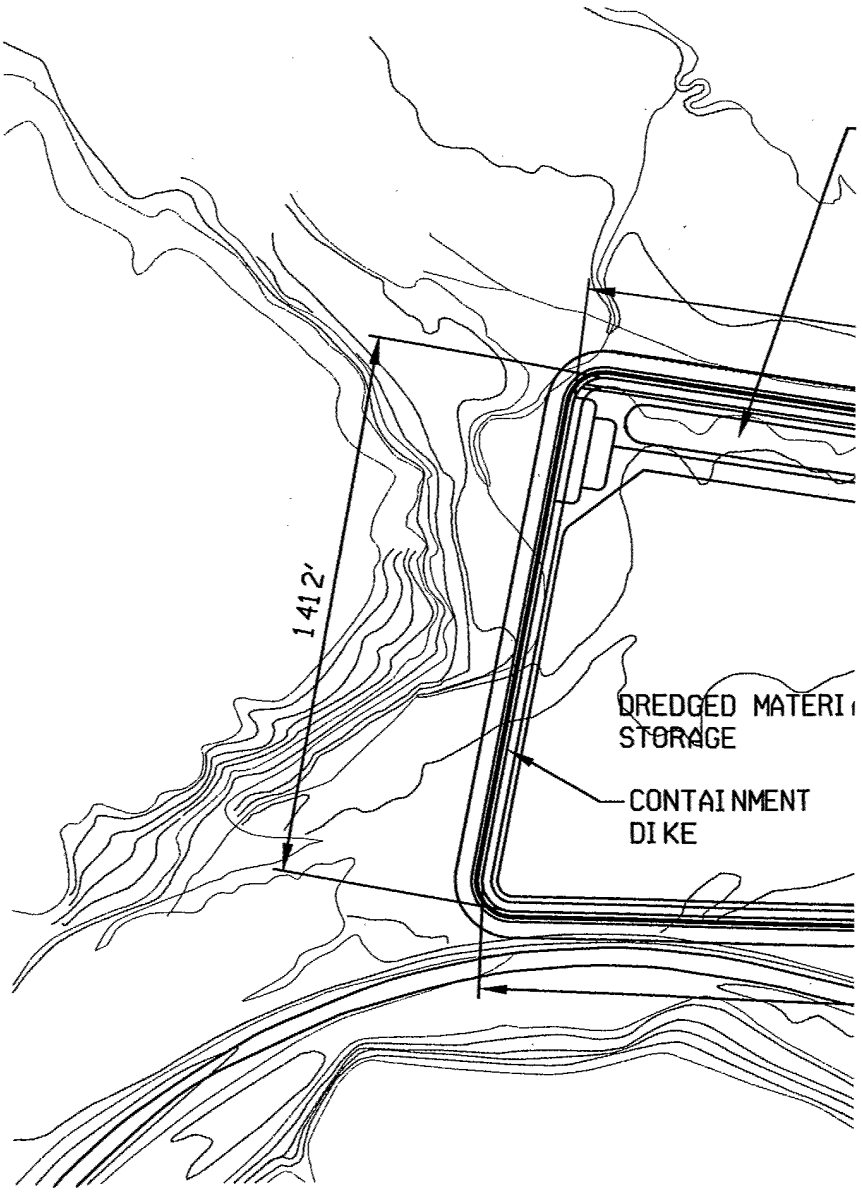
tied back into the perimeter berm and filled between the berm and the sheet pile to form a surface above water. The site will require electrical service and lighting to provide for the 24-hours-per-day operation.

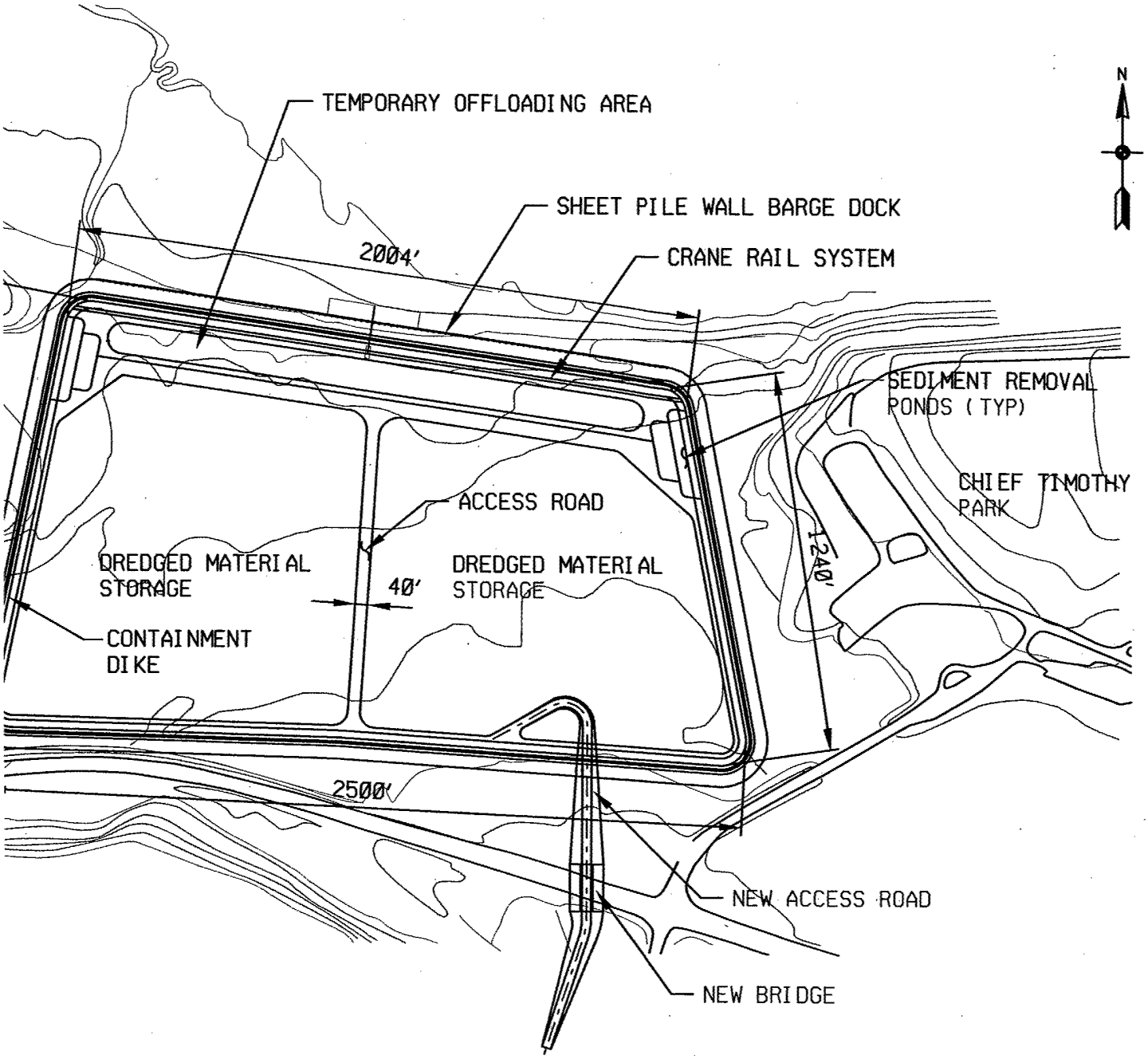
The off-loading of dredged material from barges will require that about 13,500 CY (10,321.5 m^3) per day be handled for alternatives 4b and 5b, and about 27,000 CY (20,643.0 m^3) per day be handled for alternative 6b. In order to accomplish this, two cranes will be utilized and will be located on the Chief Timothy site. The cranes will be gantry type, mounted on a rail system, and will have a 150-foot (45.7-m) horizontal boom and reach. The rails will be supported on H-piles (H12 x 84), assumed to be 20-foot (6.1-m) on centers.

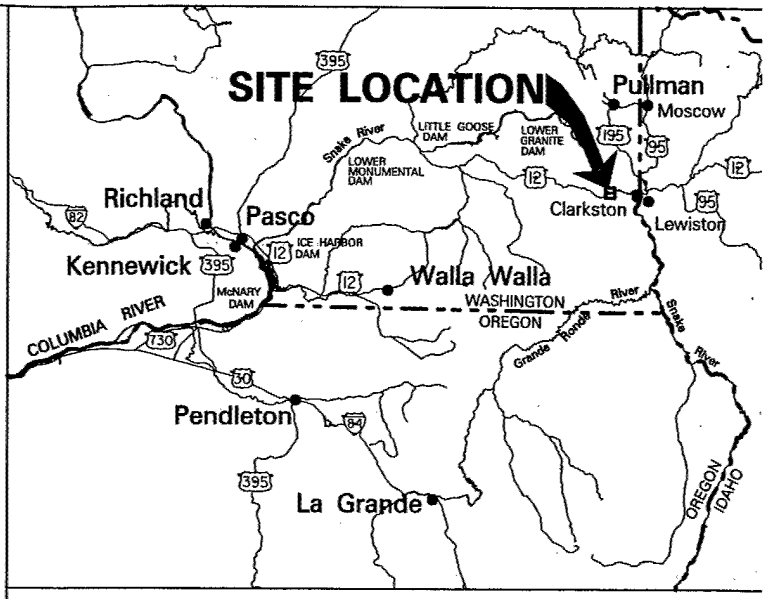
Dredged material will be off-loaded from the barges using the cranes and placed within about 200 feet (61.0 m) of the north berm and barge berthing area. Additional dewatering will occur at the material placement location and the material will then be moved onto large piles for loading onto trucks for transport to the Page Creek Site. The truck transport of material will occur throughout the year, with an assumed 254 working days per year. An average of about 4,000 CY (3,058.2 m^3) per day will need to be hauled for alternatives 4b and 5b, and about 7,900 CY (6,040.0 m^3) per day for alternative 6b. It is assumed that articulated trucks equivalent to a Caterpillar D400E would be used for the haul to Page Creek with an average load of 24 CY (18.3 m^3). Assuming a 7 1/2-hour average haul day, approximately 22 trips per hour would be required for alternatives 4b and 5b, and 44 trucks per hour would be required for alternative 6b.

The high volume of truck traffic leaving the Chief Timothy site could create significant traffic problems crossing Highway 12. To alleviate this problem, a bridge will be constructed across Highway 12. It is assumed the bridge will utilize prestressed girders and be 40 feet (12.2 m) long and 30 feet (9.1 m) wide.

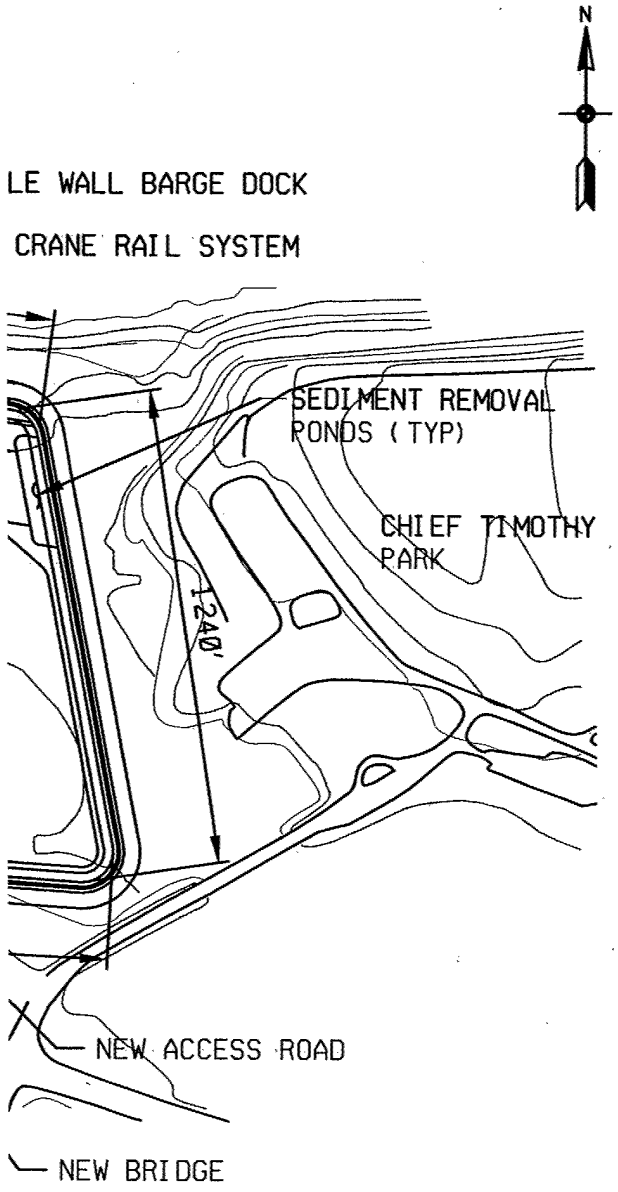
A conceptual layout for the Chief Timothy site is shown in figure D-3 and associated section and details are shown in figures D-4 and D-5.


1412'
DREDGED MATERI
STORAGE
CONTAINMENT
DIKE


TEMPORARY OFFLOADING AREA
SHEET PILE WALL BARGE DOCK
CRANE RAIL SYSTEM
2004'
N
SEDIMENT REMOVAL PONDS (TYP)
CHIEF TIMOTHY PARK
ACCESS ROAD
1240'
DREDGED MATERIAL STORAGE
40'
DREDGED MATERIAL STORAGE
CONTAINMENT DIKE
2500'
NEW ACCESS ROAD
NEW BRIDGE



Appendix D
Upland Disposal Conceptual Design



GEOGRAPHIC INFORMATION SYSTEMS
Corps of Engineers
Walla Walla District

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McNary Reservoir and Lower Snake River Reservoirs
Dredged Material Management Plan

CHIEF TIMOTHY DEDGED MATERIAL TRANSFER SITE

SITE PLAN

D-14

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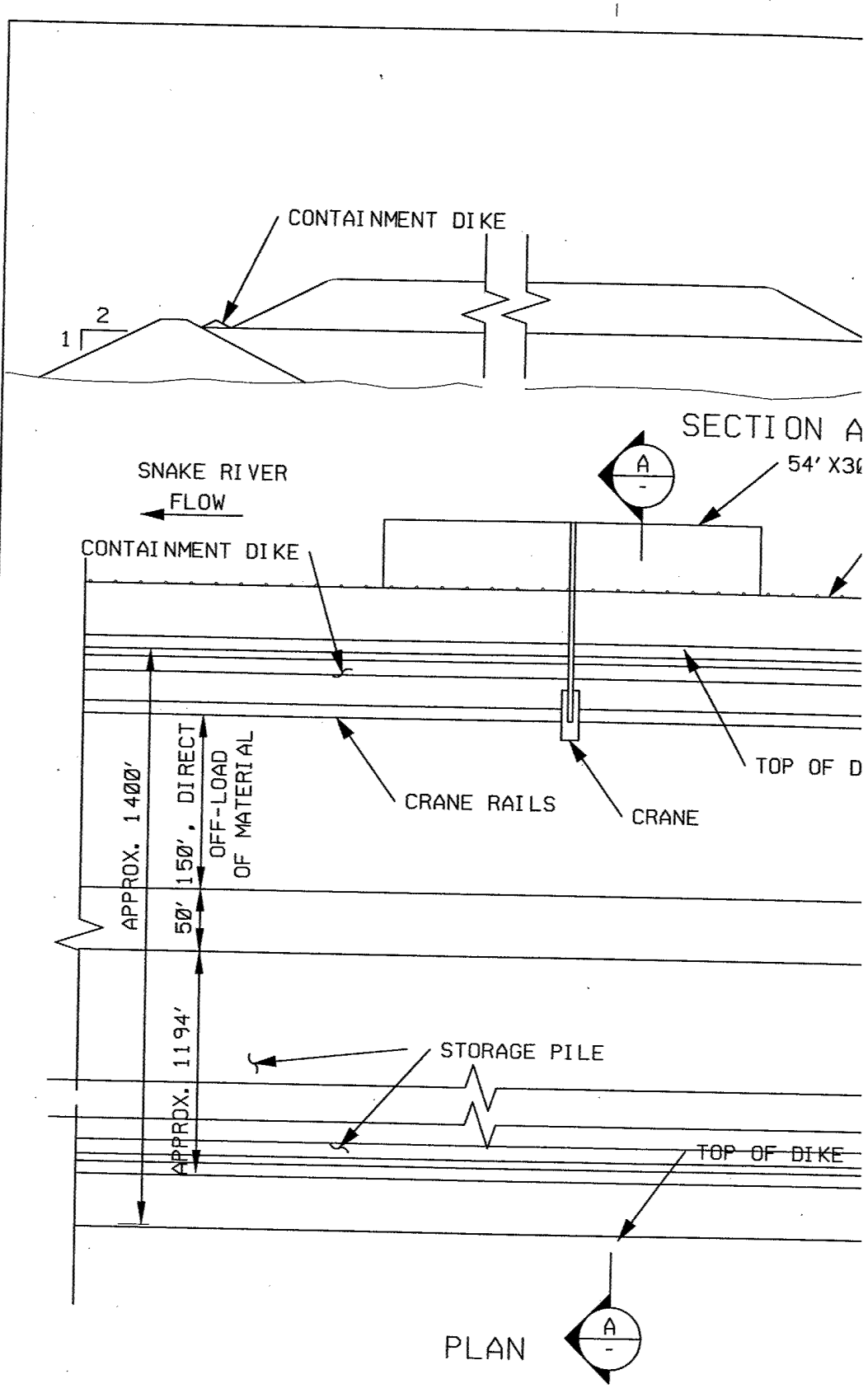
FIGURE D-3



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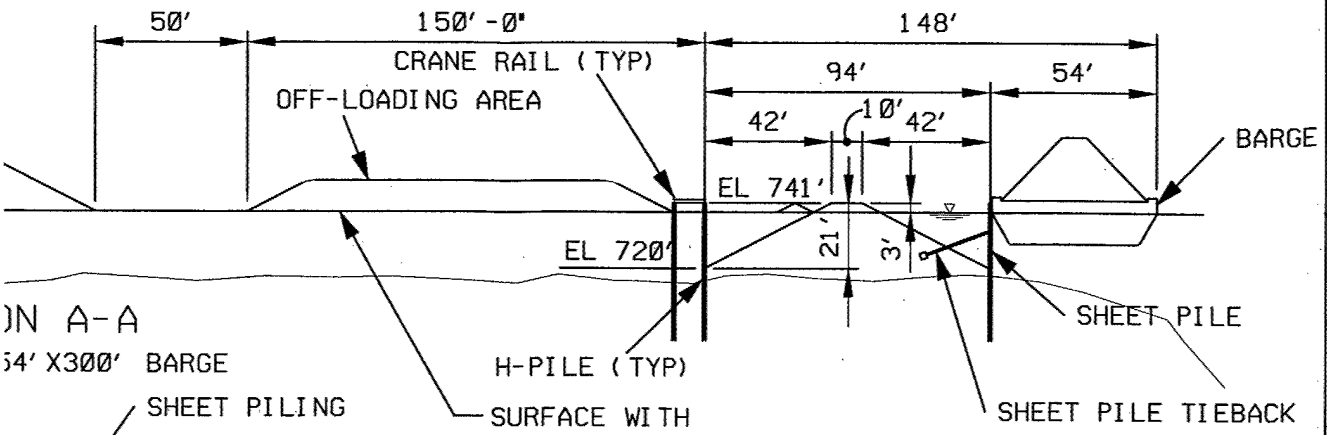
GIS Data Entry & Graphic Assembly: Applied Technology Team (CENWW-PM-PD-E-AT) GIS Conversion: George Hardin (CENWW-PM-PD-E-AT) GIS Applications Coordi



)N A-A

54' X300' BARGE

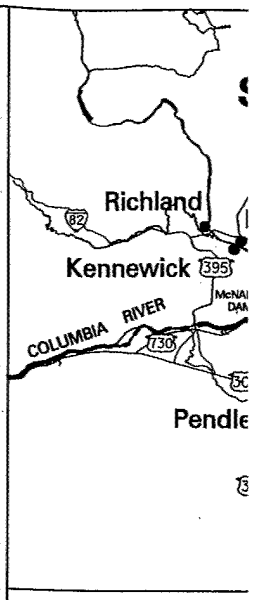
SHEET PILING

TIMBER PILES
@ 20' O.C.

CONTAINMENT DIKE

OF DIKE

DIKE



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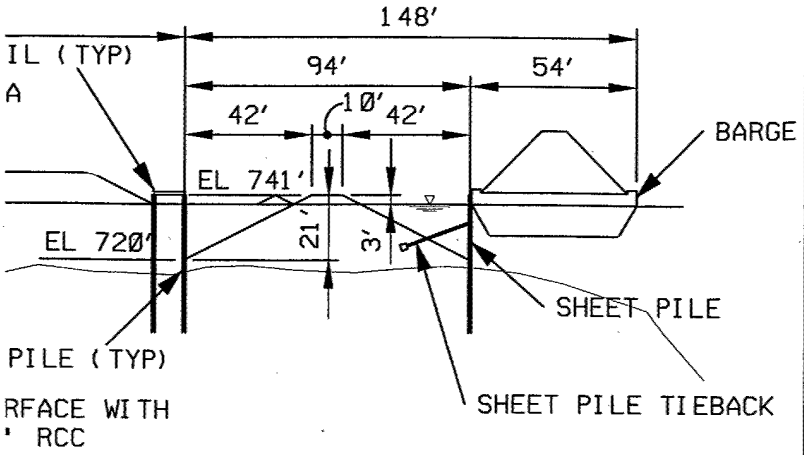

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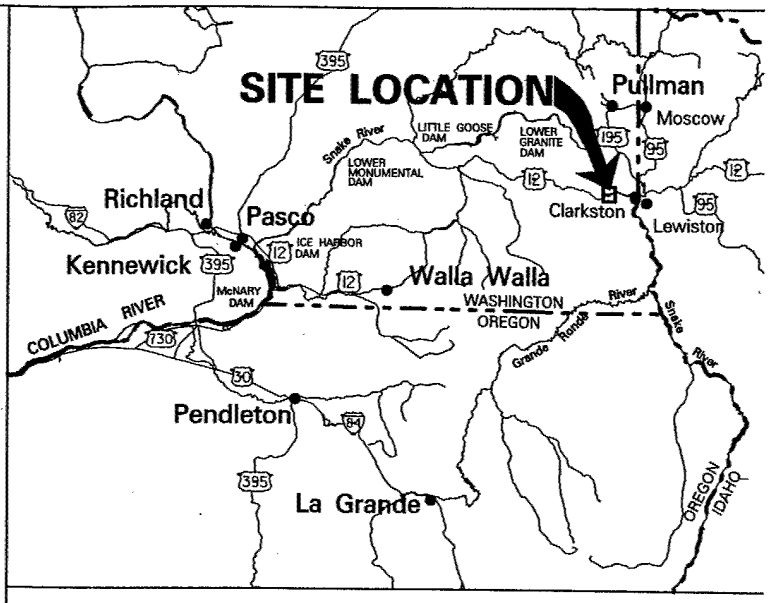

Appendix D
Upland Disposal Conceptual Design

GEOGRAPHIC INFORMATION SYSTEMS
Corps of Engineers
Walla Walla District

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McNary Reservoir and Lower Snake River Reservoirs
Dredged Material Management Plan

CHIEF TIMOTHY DREDGED MATERIAL TRANSFER SITE

PLAN AND SECTION

FIGURE D-

(3)

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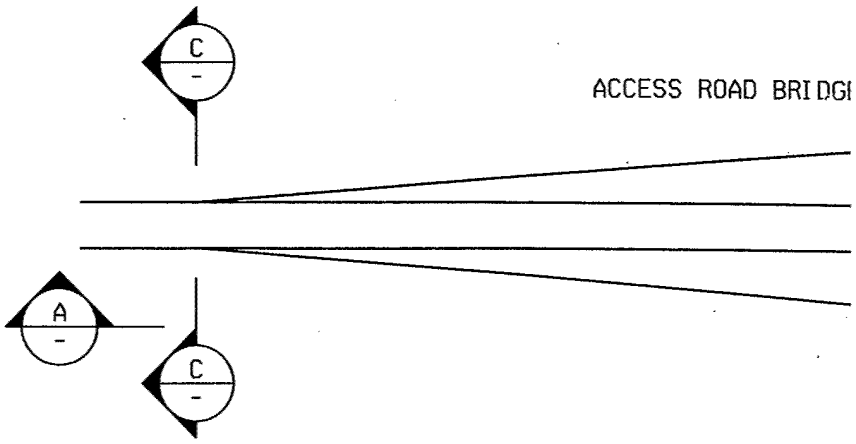
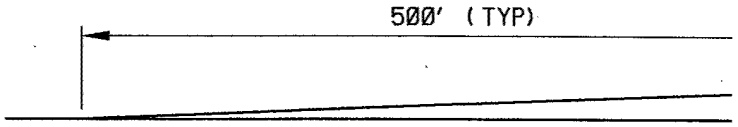
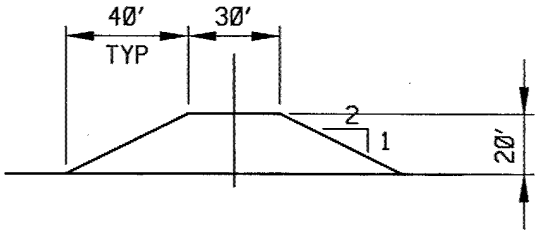
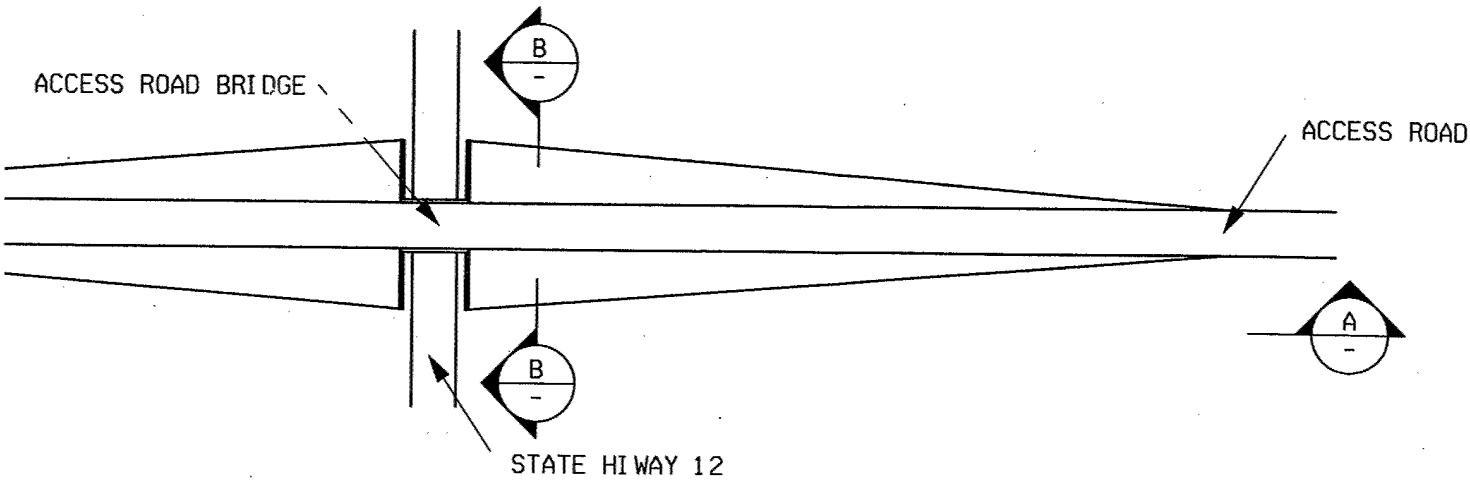




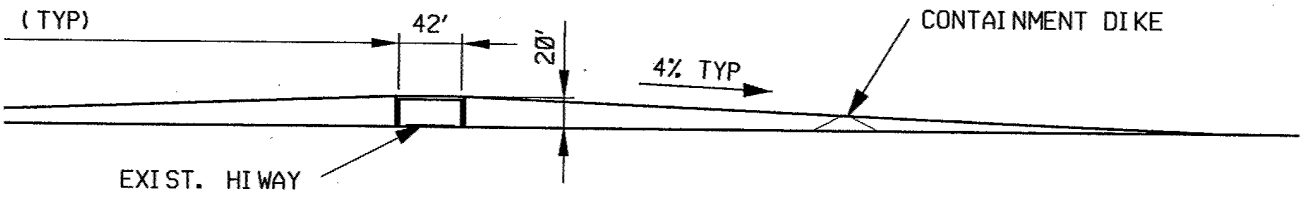


SECTION B-B
1"=50'

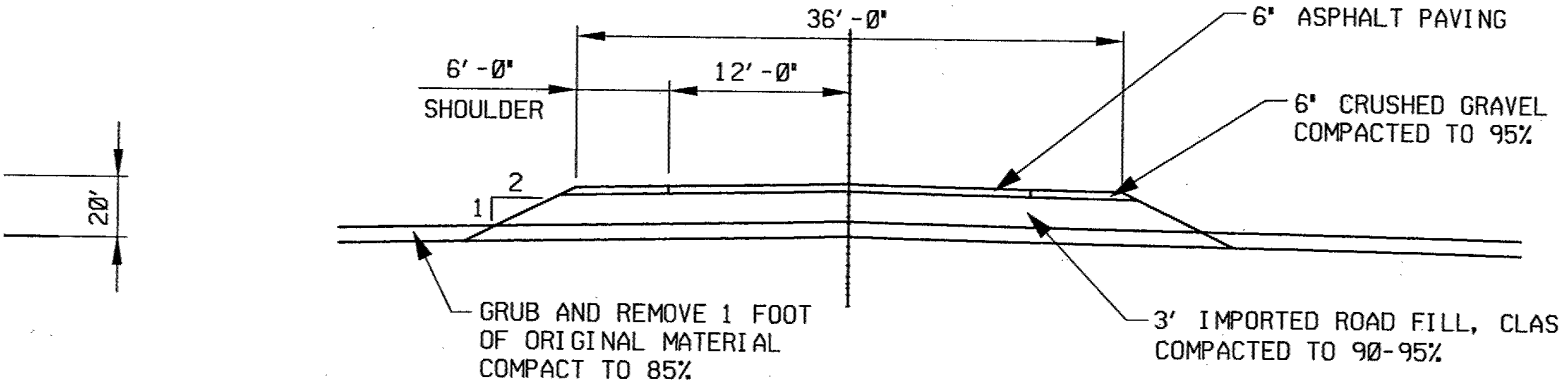
(1)



PLAN
1" = 100'

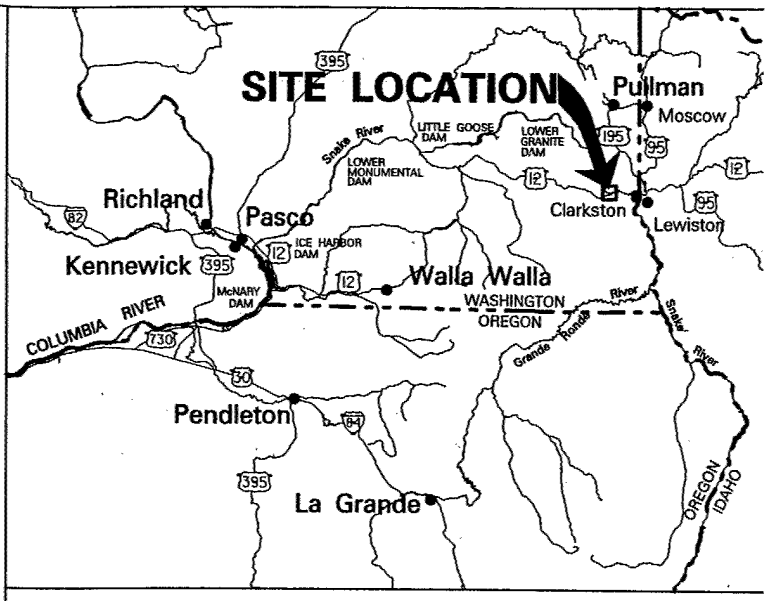


SECTION A-A
1" = 100'

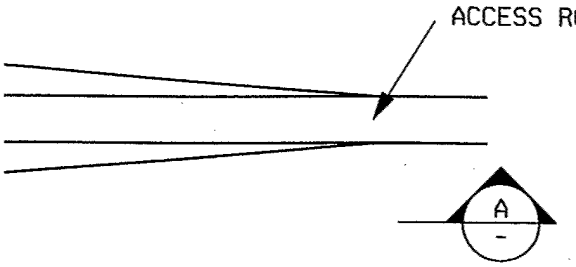


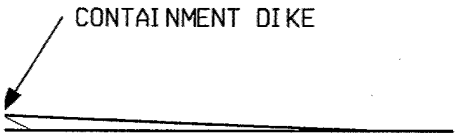
SECTION C-C
1" = 10'

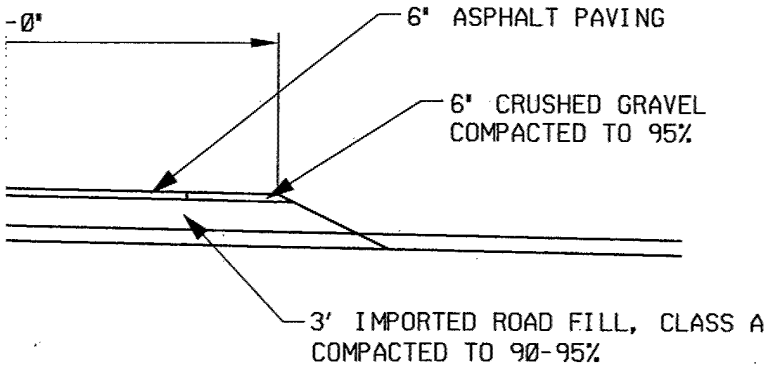
(2)



Appendix D
Upland Disposal Conceptual Design







C-C
=10'

GEOGRAPHIC INFORMATION SYSTEMS
Corps of Engineers
Walla Walla District

DRAFT

McNary Reservoir and Lower Snake River Reservoirs
Dredged Material Management Plan

BRIDGE AND ACCESS ROAD
FROM CHIEF TIMOTHY
TRANSFER SITE

PLAN AND SECTIONS

3

D-16

FIGURE D-

1999

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2.5 Page Creek Disposal Site Conceptual Design

The Page Creek site is located approximately 1 1/2 miles (2.4 km) east of the Chief Timothy site adjacent to Page Creek. The entire site is approximately 985 acres (398.6 hectares), but only a portion of the site at the western end will be used for disposal of dredged material for alternatives 4b, 5b, and 6b. The maximum amount of material placed at the site for the initial 20-year period is 40,000,000 CY (30,582,200 m^3) associated with alternative 6b. Dredged material quantities exceeding this amount could be placed at the site by extending the area used for disposal to the east. For alternative 6b, the total quantity of material through the 74th year of the project would be about 80,000,000 CY (61,164,390 m^3) [includes the 40,000,000 CY (30,582,200 m^3) for the initial 20-year period] and could be accommodated at the site. The site may also receive dredged material for the time period beyond the initial 20 years for alternative 3b. The site has a plateau on the northern portion that is presently used for agricultural crops. The site then has relatively steep slopes from the plateau down to Page Creek, a drop of about 600 vertical feet (182.9 vertical meters). The fill constructed for disposal of dredged material would extend a plateau against the southern side slope, resulting in a fill with side slopes of about 3:1. The fill height, when completed, would be about 400 vertical feet (121.9 vertical meters) for alternatives 4b and 5b and about 600 vertical feet (182.9 vertical meters) for alternative 6b.

Initial construction at the Page Creek site will include a dedicated haul road from the Chief Timothy transfer site to the lower point at which the fill will start. The road will be built by excavating about 1 foot (0.3 m) of native material and importing 3 feet (0.9 m) of fill (class A compacted at 90 to 95 percent). A 6-inch (15.2-cm) asphalt surface will be constructed on the imported fill, with a width of 24 feet (7.3 m). Six-foot (1.8-m) shoulders will be constructed using crushed gravel. Drainage ditches and culverts will be constructed as appropriate. Surface water detention ponds will be constructed in the area at the base of the fill for flow control and sediment removal.

Placement of dredged material will be accomplished in lifts with the depth to be determined during final design. The fill will progress from the bottom to the top with an on-site access road extended up the fill as it progresses. Fill layout was based on a total of 13,250,000 CY (10,130,350 m^3) for alternatives 4b and 5b, and 40,000,000 CY (30,582,200 m^3) for alternative 6b. The spreading and compacting of fill material will require at least two separate ongoing operations for alternative 6b, but can be handled with one operation for alternatives 4b and 5b. It is assumed that a fill placement operation will utilize a track-type tractor and a steel-wheeled compactor. The disposal and fill construction operation will take place throughout the year.

Restoration will take place on a periodic but ongoing basis throughout the life of the fill construction. Restoration will include placement of 6 inches (15.2 cm) of topsoil on fill slopes when final grades are reached. The slopes will be seeded to develop vegetation similar to that existing in surrounding areas. Temporary erosion control facilities will be constructed as needed throughout the fill development time period, and will include measures such as silt fences, temporary sediment removal ponds, and temporary ground cover systems.

The height and size of the fill to be constructed at the Page Creek site could present problems with respect to stability, especially during a seismic event. Stability analyses should be conducted as part of the final design and may result in the design of a major toe berm, an excavated key trench at the toe, or reinforced earth construction near the toes.

Conceptual layouts and cross-sections for the Page Creek site are shown in figures D-6, D-7, and D-8.

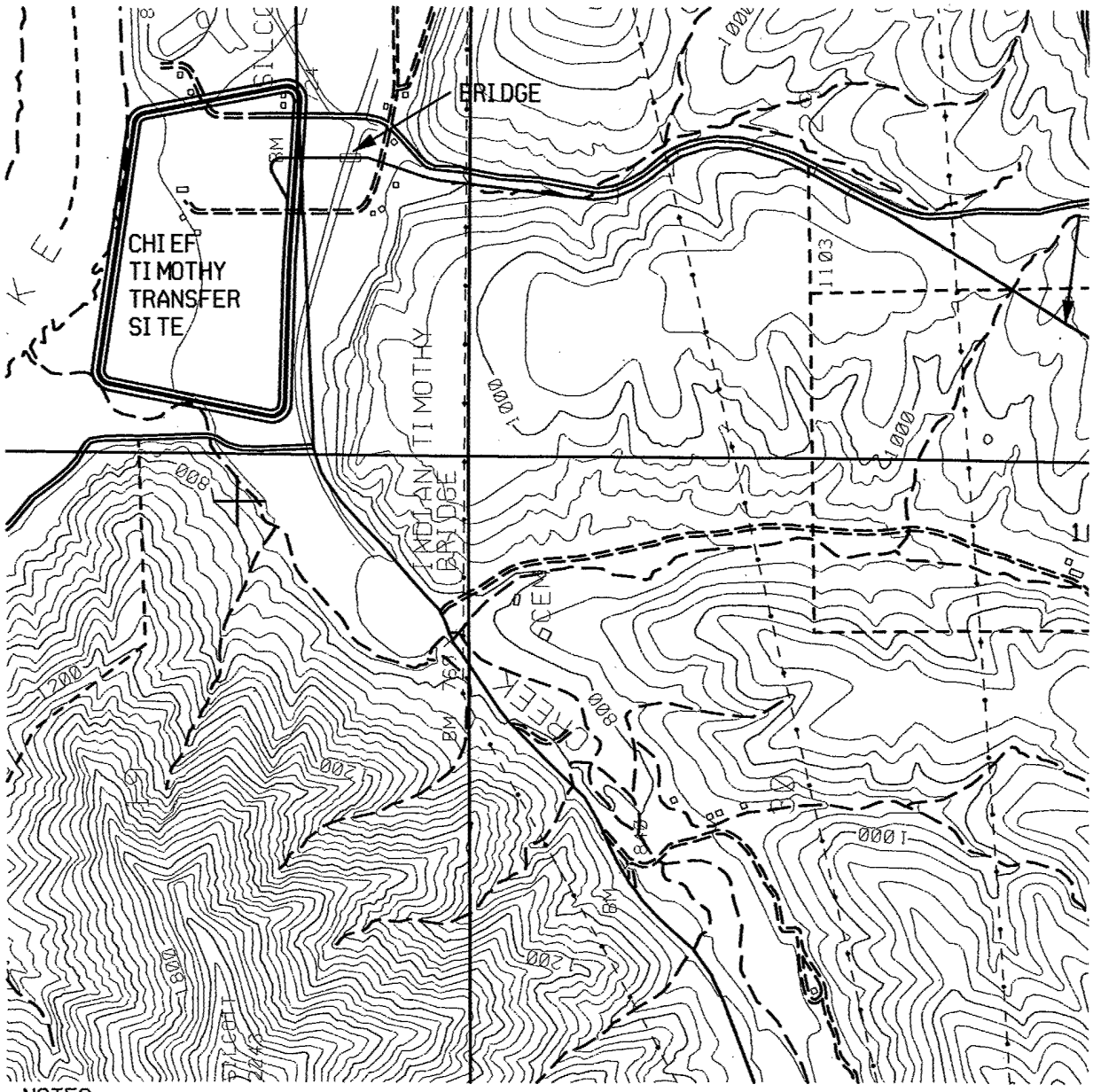
3.0 CONSTRUCTION MATERIAL QUANTITIES

Construction material quantities were developed for the upland disposal and transfer sites, and these quantity estimates are presented in the tables D-4 through D-6.

4.0 ESTIMATED UPLAND DISPOSAL COSTS

The Corps Walla Walla District staff developed cost estimates for the dredging alternatives utilizing upland disposal sites. The cost estimates included costs for initial construction at the sites and for dredging operations.

These cost estimates are presented in table D-7.



NOTES:

1. SURFACE WATER DETENTION AND SEDIMENT REMOVAL FACILITIES TO BE LOCATED IN BUFFER AREA, SPECIFIC LOCATIONS DETERMINED IN FINAL DESIGN.

LEGEND:

① LOCATION OF SECTIONS, SEE

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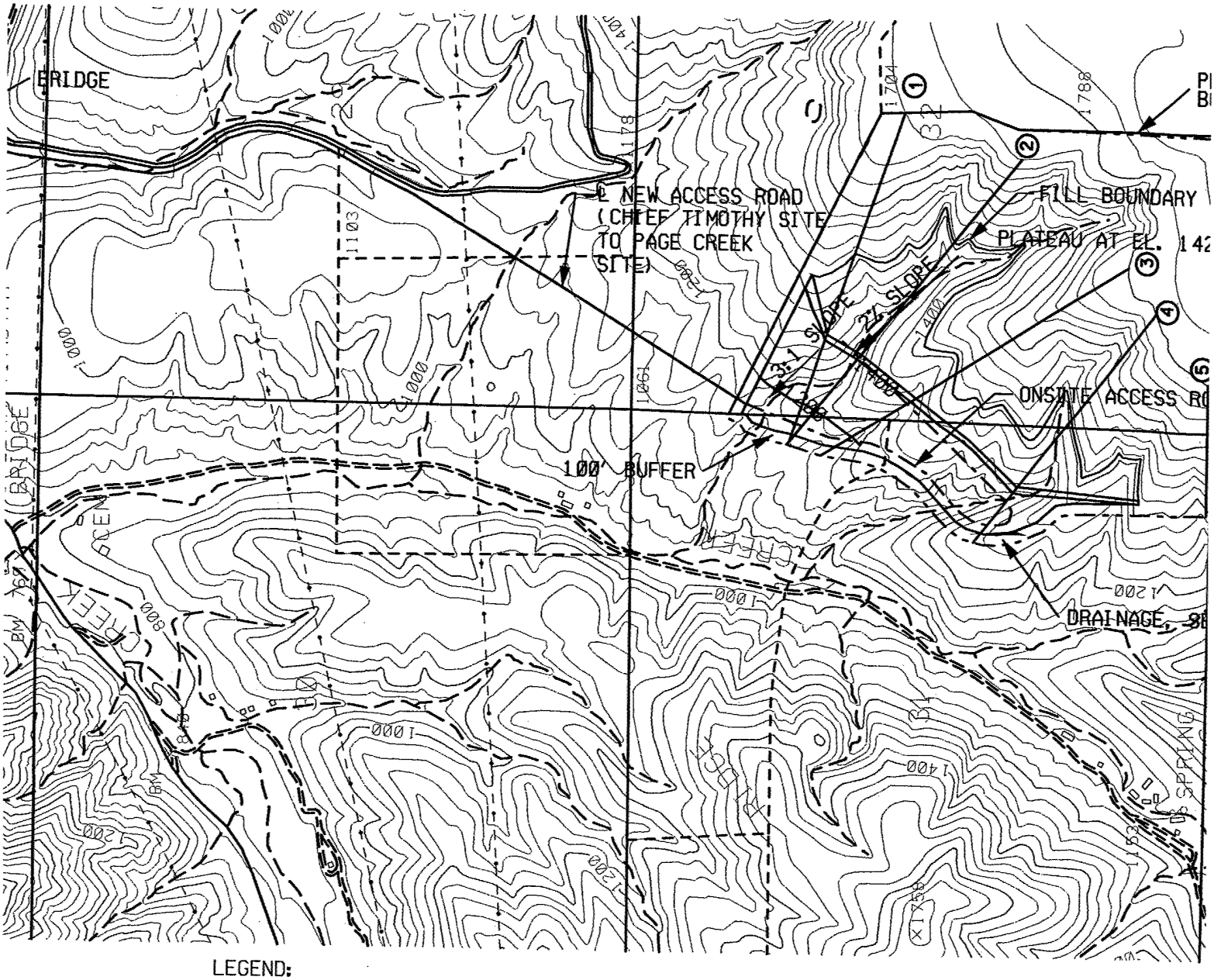

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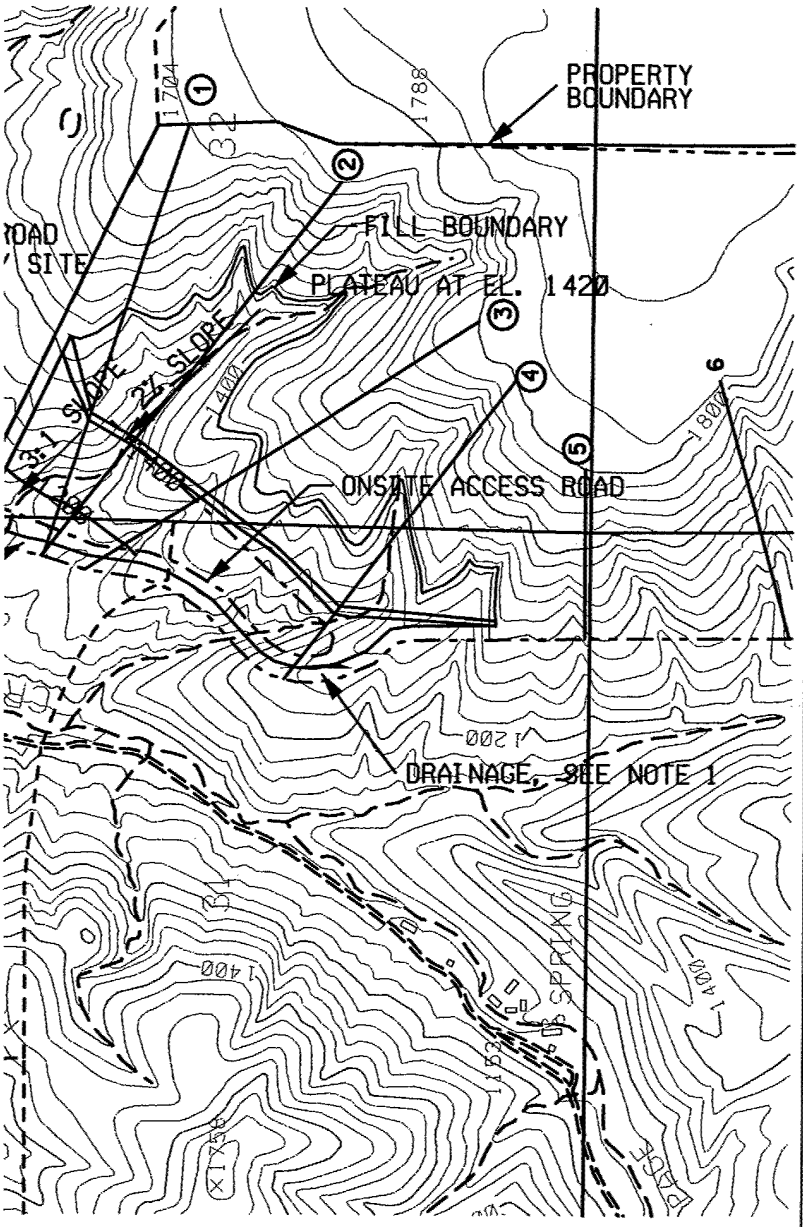

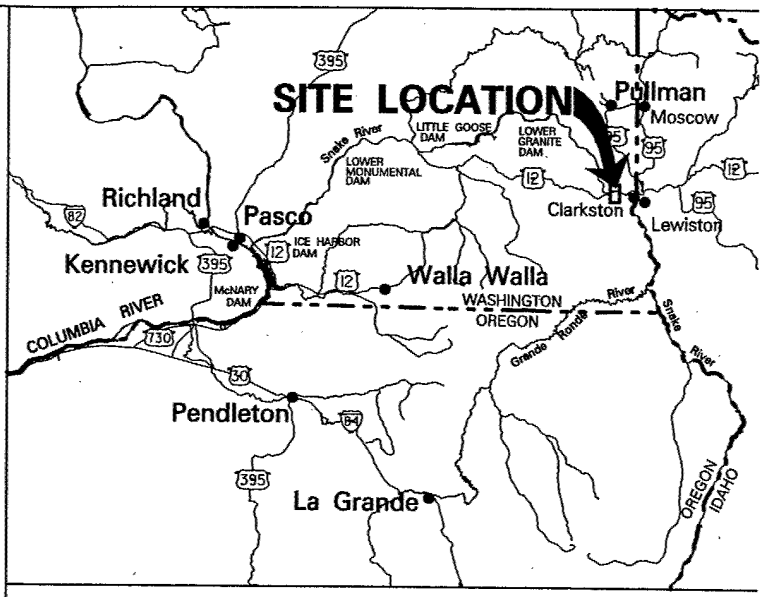

Appendix D
Upland Disposal Conceptual Design

1000 0 1000 2000 FEET
1" = 1000'

GEOGRAPHIC INFORMATION SYSTEMS
Corps of Engineers
Walla Walla District

DRAFT

McNary Reservoir and Lower Snake River Reservoirs
Dredged Material Management Plan

PAGE CREEK DREDGED MATERIAL DISPOSAL SITE
SITE PLAN
1,000,000 CU. YD. PER YEAR DISPOSAL ALTERNATIVE

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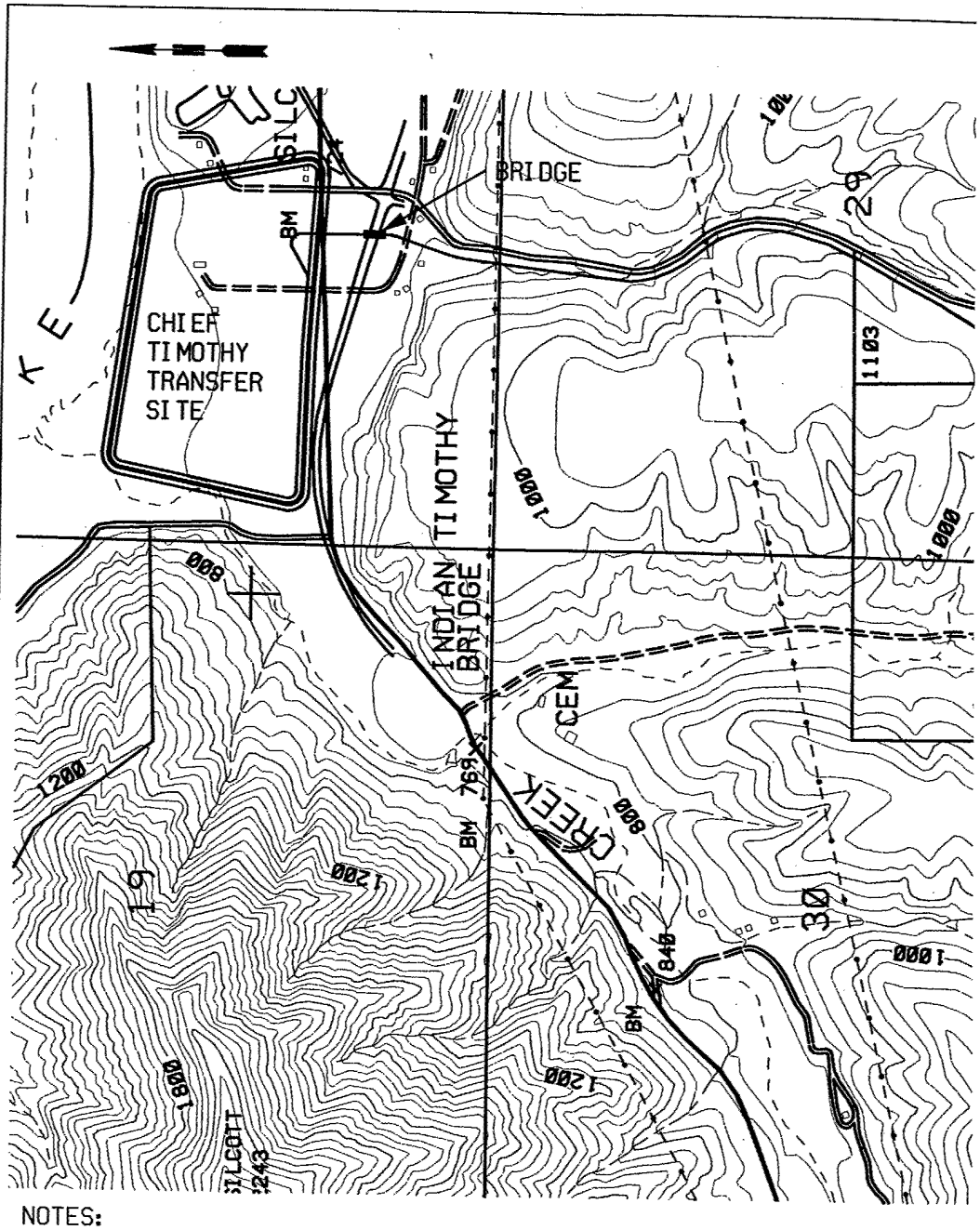

NOTES:

1. SURFACE WATER DETENTION AND SEDIMENT REMOVAL FACILITIES TO BE LOCATED IN BUFFER AREA, SPECIFIC LOCATIONS DETERMINED IN FINAL DESIGN.

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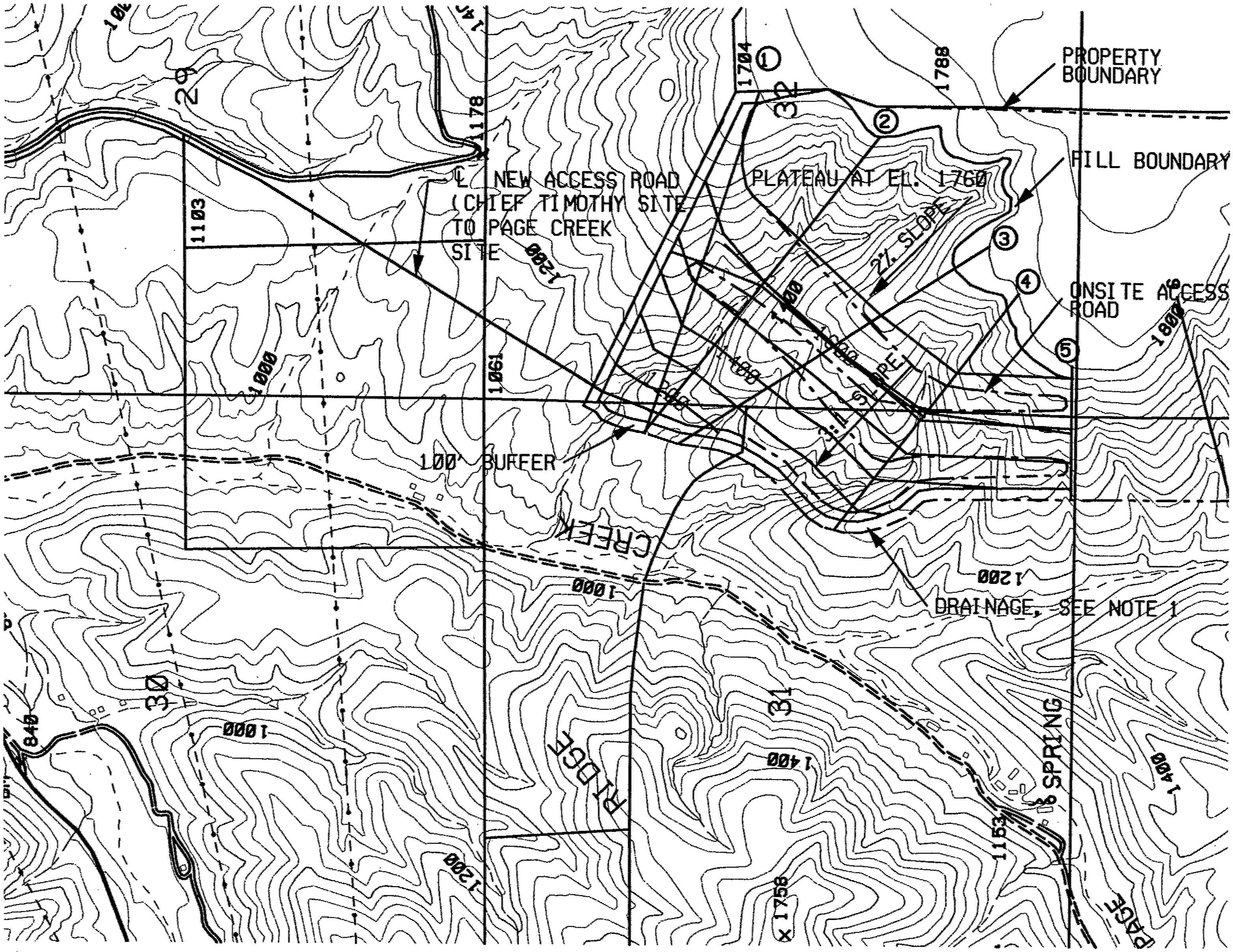
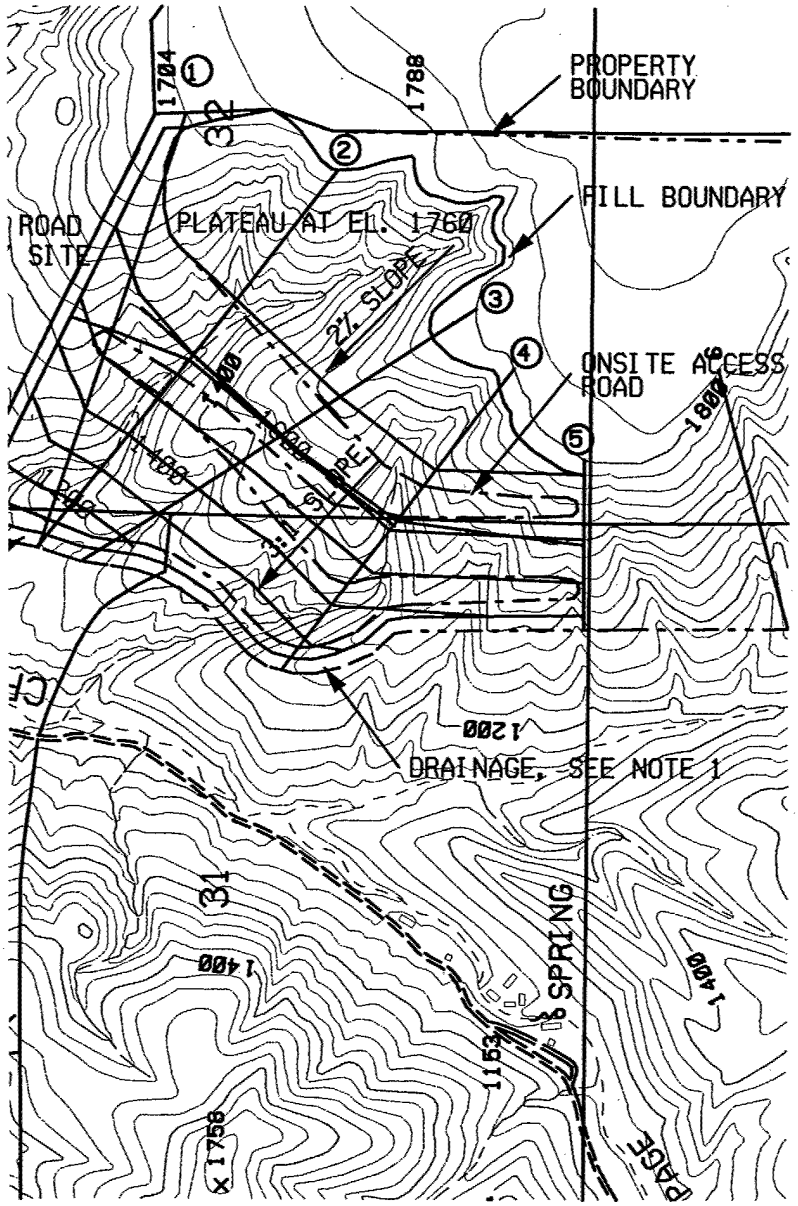
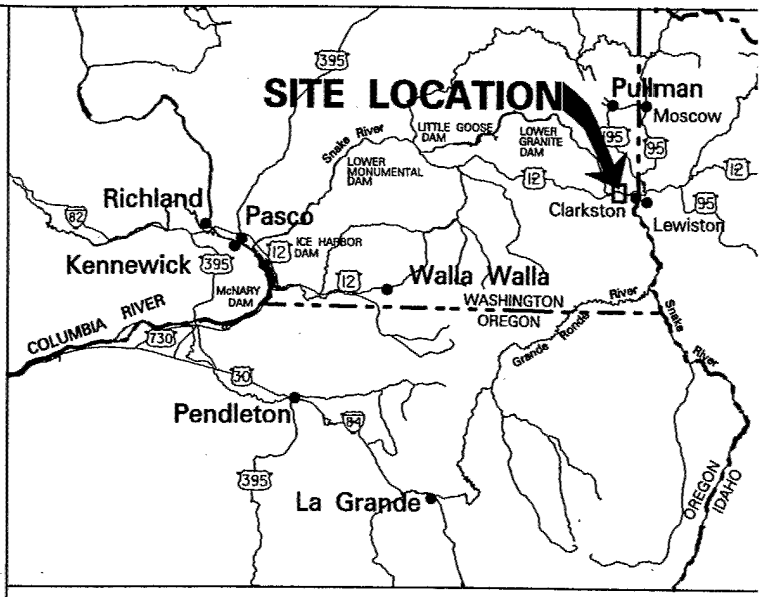


LEGEND:

① LOCATION OF SECTIONS, SEE FIGURE D-8





Appendix D
Upland Disposal Conceptual Design

1000 0 1000 2000 FEET

1" = 1000'

GEOGRAPHIC INFORMATION SYSTEMS
Corps of Engineers
Walla Walla District

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McNary Reservoir and Lower Snake River Reservoirs

Dredged Material Management Plan

PAGE CREEK DREDGED MATERIAL DISPOSAL SITE

SITE PLAN

2,000,000 CU. YD. PER YEAR DISPOSAL ALTERNATIVE

FIGURE D-3

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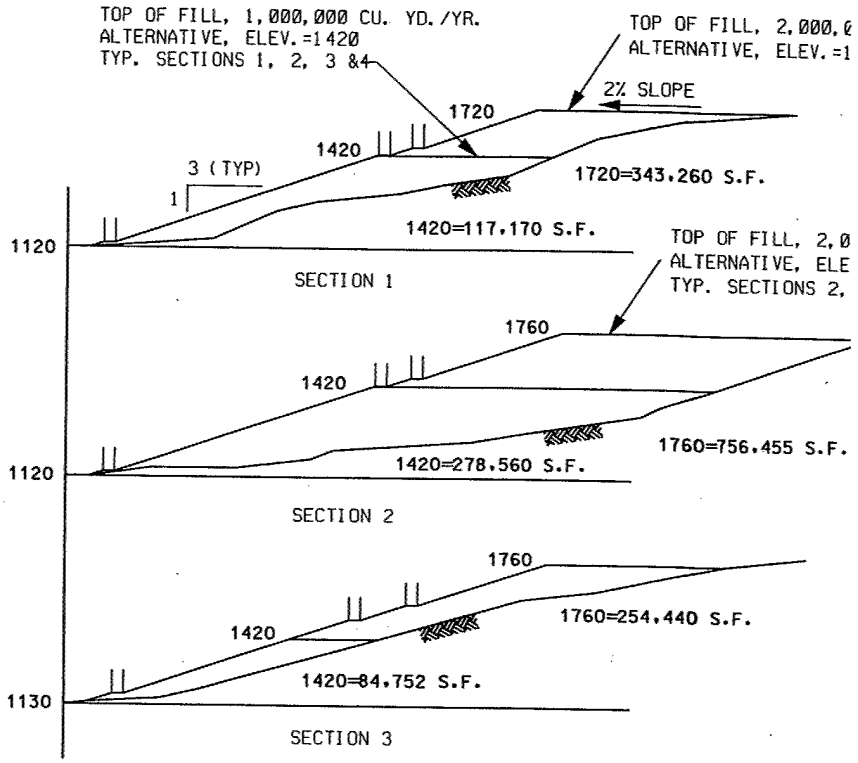
D-20



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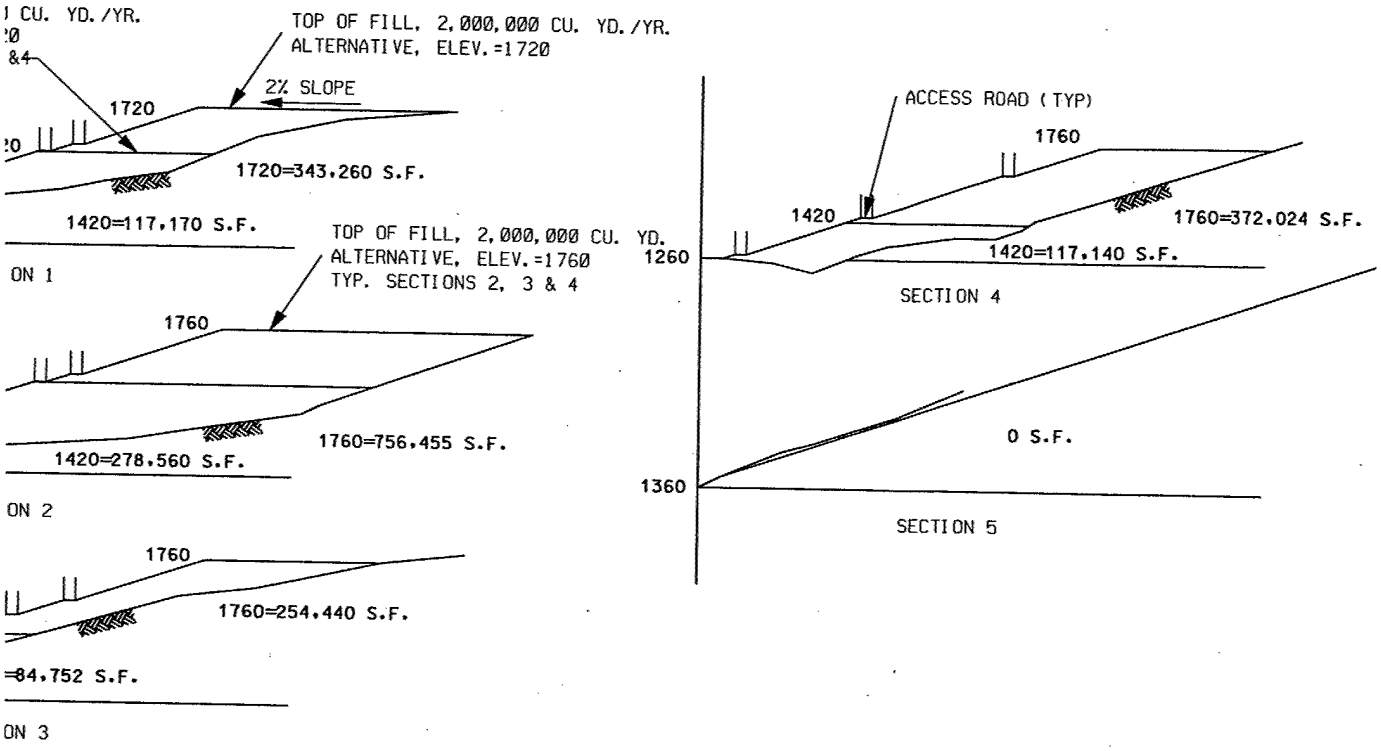
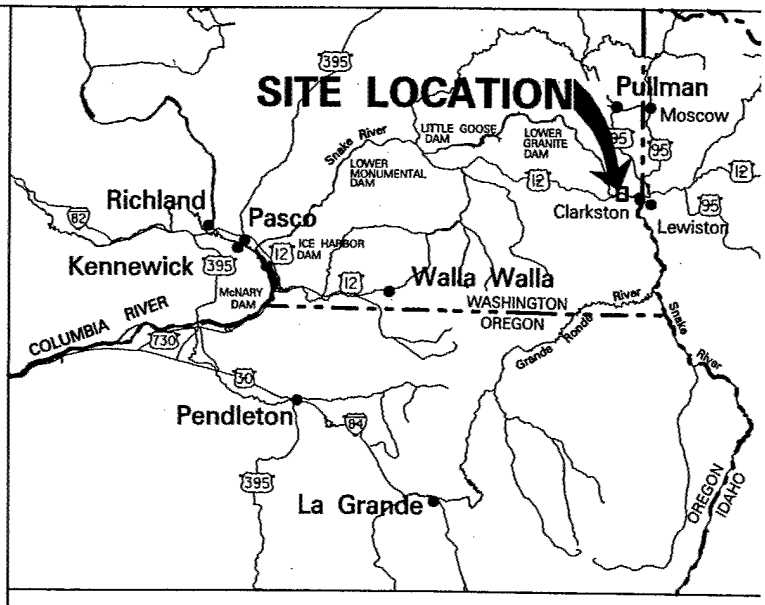

CU. YD./YR.
TOP OF FILL, 2,000,000 CU. YD./YR.
ALTERNATIVE, ELEV.=1720
2% SLOPE
1720
1720=343,260 S.F.
1420=117,170 S.F.
TOP OF FILL, 2,000,000 CU. YD.
ALTERNATIVE, ELEV.=1760
TYP. SECTIONS 2, 3 & 4
ON 1
1760
1760=756,455 S.F.
1420=278,560 S.F.
ON 2
1760
1760=254,440 S.F.
=84,752 S.F.
ON 3
ACCESS ROAD (TYP)
1760
1420
1760=372,024 S.F.
1420=117,140 S.F.
1260
SECTION 4
0 S.F.
1360
SECTION 5

(2)



Appendix D
Upland Disposal Conceptual Design

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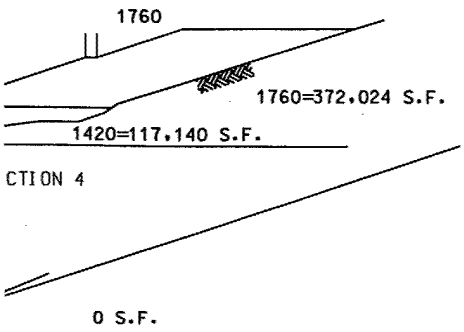
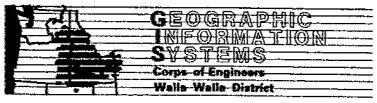


CTION 4

CTION 5



DRAFT

McNary Reservoir and Lower Snake River Reservoirs
Dredged Material Management Plan

PAGE CREEK DREDGED MATERIAL DISPOSAL SITE

FILL CROSS SECTIONS

FIGURE D-

D-21

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1999

Table D-4. Joso Site Construction Quantity Estimates.

Item		Units
Item 1 - Barge Slip (3)		
Item 1.a	Dredging for Slip	77,780 CY (59,467.1 m^3)
Item 1.b	Sheetpiling, 3/8-inch (0.318-cm) thick	1,900 TONS (1,720 TONNES)
Item 1.c	Barge tie-offs, 1- to 1.5-foot- (0.3- to 0.5-m-) diameter wood poles	759 linear feet (LF) (231.3 m)
Item 2 - Staging Area		
Item 2.a	Containment berm/erosion control [3 feet (0.9 m) high, 2:1 slope]	
Item 2.a.1	Low permeability material, 2:1 slope	390 CY (298.2 m^3)
Item 2.a.2	Geotextile fabric	1,640 square yards (SY) (1,371.2 m^2)
Item 2.a.3	Topsoil	270 CY (206.4 m^3)
Item 2.a.4	Seeding	14,700 square feet (SF) (1,365.7 m^2)
Item 2.b	Drainage	
Item 2.b.1	Settling pond excavation	840 CY (642.2 m^3)
Item 2.b.2	Detention pond excavation	460 CY (351.7 m^3)
Item 3 - Storage Area		
Item 3.a	Containment berm/erosion control [3 feet (0.9 m) high, 2:1 slope]	
Item 3.a.1	Low permeability material, 2:1 slope	6,700 CY (5,122.5 m^3)
Item 3.a.2	Geotextile fabric	154,000 SY (128,763.6 m^2)
Item 3.a.3	Topsoil	2,480 CY (1,896.1 m^3)
Item 3.a.4	Seeding	154,000 SF (14,307.1 m^2)
Item 3.b	Drainage	
Item 3.b.1	Settling pond excavation	840 CY (642.2 m^3)
Item 3.b.2	Detention pond excavation	460 CY (351.7 m^3)
Item 3.c	Restoration	
Item 3.c.1	6 inches (15.2 cm) topsoil, quantity per year	11,800 CY (9,021.8 m^3)
Item 3.c.2	Geonet/hydroseed, quantity per year	15 ACRES (6.1 HECTARES)

NOTES:
- One barge slip will be built for off-loading the dredged material.
- All equipment will be barged to the site.
- The slip for the barges will be built up from the edge of the shore with the crane sitting up higher than the barge to limit the slope the trucks will haul up. The slip is at the west end of the site.
- Two temporary storage pads will be constructed, one on either side of the slip to temporarily store an entire year's dredged material. Each pad will be bermed and have settling ponds.
- The storage area is in the interior of the site. It, too, will be bermed with five settling pond systems. The dredged material disposal area will be restored on a per-year basis.

Table D-5. Chief Timothy Construction Quantity Estimates.

Item		Units
Item 1 - Pad		
Item 1.a	Outer berm	
Item 1.a.1	Rock embankment [3 feet (0.9 m)]	34,840 CY (26,637.1 m^3)
Item 1.a.2	10-foot- (3.0-m-) wide road surface, base course, 1 foot (0.3 m) deep	3,200 CY (2,446.6 m^3)
Item 1.b	Inner berm	
Item 1.b.1	Structural fill, Class B DOT	56,260 CY (43,013.9 m^3)
Item 1.c	Interior fill - use river dredge	2,000,000 CY (1,529,110.0 m^3)
Item 1.d	RCC [1 foot (0.3 m) thick]	10,111 CY (7,730.4 m^3)
Item 1.e	Interior containment berm	
Item 1.e.1	Low permeability material, 2:1 slope, 3 feet (0.9 m) high	4,800 CY (3,669.9 m^3)
Item 1.e.2	Geotextile fabric	12,250 SY (10,242.6 m^2)
Item 1.e.3	Topsoil	1,800 CY (1,376.2 m^3)
Item 1.e.4	Seeding	110,000 SF (10,219.3 m^2)
Item 1.f	Dewatering/sediment removal basin	OMIT
Item 1.g	Electrical service to site (230 V, 1 phase)	3,000 feet (914.4 m)
Item 1.h	Barge slip (2)	
Item 1.h.1	Dredging for slips	0 CY (0 m^3)
Item 1.h.2	Sheetpiling, 3/8-inch (0.318-cm) thick	576 TONS (521 TONNES)
Item 1.h.3	Barge tie-offs, 1- to 1.5-foot- (0.3- to 0.5-m-) diameter wood poles	578 LF (176.2 m)
Item 1.h.4	Fill behind sheet pile	40,000 CY (30,582.2 m^3)
Item 1.i	Construction equipment	
Item 1.i.1	Crane	1 EA
Item 1.i.2	Crane rails and supports	
Item 1.i.2.a	H piles, H12 x 84	8,400 FT (2,560.3 m)
Item 1.i.2.b	Reinforced concrete, beams on H piles	940 CY (718.7 m^3)
Item 1.i.2.c	Rails, 135 lb/linear yard (67 kilograms/meter)	4,200 FT (1,280.2 m)
Item 1.j	Drainage	
Item 1.j.1	Settling pond excavation	2,800 CY (2,140.8 m^3)
Item 1.j.2	Detention pond excavation	26,000 CY (19,878.4 m^3)

Table D-6. Page Creek Site Construction Quantity Estimates.

Item		2,000,000 CY (1,529,110 m^3)	1,000,000 CY (764,555 m^3)
Item 1 - Access road			
Item 1.a	Clear/grub	10 ACRES (4.0 HECTARES)	10 ACRES (4.0 HECTARES)
Item 1.b	Cut and fill	75,000 CY (57,341.6 m^3)	75,000 CY (57,341.6 m^3)
Item 1.c	Road surfacing	3,100 CY (2,370.1 m^3)	3,100 CY (2,370.1 m^3)
Item 1.d	Drainage		
Item 1.d.1	Culverts, 18-inch (45.7-cm) diameter	230 LF (70.1 m)	230 LF (70.1 m)
Item 1.d.2	Ditches/erosion control	7,700 LF (2,347.0 m)	7,700 LF (2,347.0 m)
Item 1.e	Restoration (sides only)	5 ACRES (2.0 HECTARES)	5 ACRES (2.0 HECTARES)
Item 2 - Disposal			
Item 2.a	Containment berm/erosion control (at bottom)		
Item 2.a.1	Low permeability material, 2:1 slope	2,700 CY (2,064.3 m^3)	2,700 CY (2,064.3 m^3)
Item 2.a.2	Geotextile fabric	6,800 SY (5,685.7 m^2)	6,800 SY (5,685.7 m^2)
Item 2.a.3	Topsoil	1,000 CY (764.6 m^3)	1,000 CY (764.6 m^3)
Item 2.a.4	Seeding	60,000 SF (5,574.2 m^2)	60,000 SF (5,574.2 m^2)
Item 2.b	Drainage		
Item 2.b.1	Settling pond excavation	16,000 CY (12,232.9 m^3)	8,000 CY (6,116.4 m^3)
Item 2.b.2	Detention pond excavation	58,000 CY (44,344.2 m^3)	29,000 CY (22,172.1 m^3)
Item 2.c	Culverts		
Item 2.c.1	18-inch (45.7-cm) diameter	500 LF (152.4 m)	250 LF (76.2 m)
Item 2.c.2	12-inch (30.5-cm) diameter	280 LF (85.3 m)	140 LF (42.7 m)
Item 2.d	Restoration		
Item 2.d.1	6 inches (15.2 cm) topsoil, quantity per year	9,100 CY (6,957.4 m^3)	4,000 CY (3,058.2 m^3)
Item 2.d.2	Geonet/hydroseed, quantity per year	12 ACRES (4.9 HECTARES)	5 ACRES (2.0 HECTARES)
Item 3 - Construction equipment			
Item 3.a	D9 Cat	2 EA	2 EA
Item 3.b	815G compactor, sheep's foot	0 EA	2 EA
Item 3.c	825G compactor, sheep's foot	2 EA	0 EA
Item 4 - Bridge			
Item 4.a	Embankment, Class A fill, compacted	18,600 CY (14,220.7 m^3)	18,600 CY (14,220.7 m^3)

Table D-7. Estimated Upland Disposal Costs.

Description		Years	Estimated Dredged Material Disposal Quantity Per Year	Annual $ Costs
Item 1 - Confluence Dredging Snake & Clearwater Rivers				
Item 1.a	Initial construction of Chief Timothy transfer site and Page Creek upland disposal site, template dredge operation, and upland disposal at Chief Timothy	1	2,000,000 CY (1,529,110 m^3)	**$12,313,000**
Item 1.b	Initial construction of Chief Timothy transfer site RCC cap, template dredge operation, and upland disposal at Page Creek	2	2,000,000 CY (1,529,110 m^3)	**$21,095,000**
Item 1.c	Template dredge operation and upland disposal at Page Creek	3-20	2,000,000 CY (1,529,110 m^3)	**$20,232,000**
Item 1.d	Maintenance dredge operation and upland disposal at Page Creek	21-end	725,000 CY (554,302 m^3)	**$8,309,000**
Item 2 - Confluence Dredging Snake & Clearwater Rivers				
Item 2.a	Initial construction of Chief Timothy transfer site and Page Creek upland disposal site, template dredge operation, and upland disposal at Chief Timothy	1	1,000,000 CY (764,555 m^3)	**$8,798,000**
Item 2.b	Template dredge operation and upland disposal at Chief Timothy	2	1,000,000 CY (764,555 m^3)	**$3,896,000**
Item 2.c	Initial construction of Chief Timothy transfer site RCC cap, template dredge operation, and upland disposal at Page Creek	3	1,000,000 CY (764,555 m^3)	**$11,170,000**
Item 2.d	Template dredge operation and upland disposal at Page Creek	4-10	1,000,000 CY (764,555 m^3)	**$10,307,000**
Item 2.e	Maintenance dredge operation and upland disposal at Page Creek	11-end	325,000 CY (248,480 m^3)	**$5,737,000**
Item 3 - Confluence Dredging Snake & Clearwater Rivers				
Item 3.a	Initial construction Joso upland disposal site, template dredge operation, and upland disposal at Joso	1	300,000 CY (229,367 m^3)	**$9,738,000**
Item 3.b	Template dredge operation and upland disposal at Joso	2-20	300,000 CY (229,367 m^3)	**$4,824,000**
Item 3.c	Initial construction of Chief Timothy transfer site, template dredge operation, and upland disposal at Chief Timothy	21	300,000 CY (229,367 m^3)	**$5,831,000**
Item 3.d	Template dredge operation and upland disposal at Chief Timothy	22-26	300,000 CY (229,367 m^3)	**$1,682,000**
Item 3.e	Initial construction of Page Creek upland disposal site, template dredge operation, and disposal at Chief Timothy	27	300,000 CY (229,367 m^3)	**$2,435,000**
Item 3.f	Initial construction of Chief Timothy transfer site RCC cap, template dredge operation, and upland disposal at Page Creek	28	300,000 CY (229,367 m^3)	**$4,480,000**
Item 3.g	Template dredge operation and upland disposal at Page Creek	29-end	300,000 CY (229,367 m^3)	**$3,617,000**

Table D-7. Estimated Upland Disposal Costs (continued).

	Description	Years	Estimated Dredged Material Disposal Quantity Per Year	Annual $ Costs
Item 4 - Confluence Dredging Snake & Clearwater Rivers				
Item 4.a	Initial construction Joso upland disposal site, maintenance dredge operation, and upland disposal at Joso	5	41,500 CY (31,729 m^3)	**$3,199,000**
Item 4.b	Maintenance dredge operation and upland disposal at Joso	10	41,500 CY (31,729 m^3)	**$1,000,000**
Item 4.c	Maintenance dredge operation and upland disposal at Joso	20	50,000 CY (38,228 m^3)	**$1,000,000**
Item 4.d	Maintenance dredge operation and upland disposal at Joso	10-yr intervals - end	50,000 CY (38,228 m^3)	**$1,000,000**
Item 5 - Dredging McNary Reservoir				
Item 5.a	Initial construction Joso upland disposal site, maintenance dredge operation, and upland disposal at Joso	1	32,000 CY (24,466 m^3)	**$2,882,000**
Item 5.b	Maintenance dredge operation and upland disposal at Joso	2-end at 2-yr intervals	32,000 CY (24,466 m^3)	**$683,000**
Item 6 - Dredging Ice Harbor Reservoir				
Item 6.a	Maintenance dredge operation and upland disposal at Joso	1-end at 2-yr intervals	2,000 CY (1,529 m^3)	**$204,000**
Item 7 - Dredging Lower Monumental Reservoir				
Item 7.a	Maintenance dredge operation and upland disposal at Joso	1-end at 2-yr intervals	2,000 CY (1,529 m^3)	**$208,000**
Item 8 - Dredging Little Goose Reservoir				
Item 8.a	Maintenance dredge operation and upland disposal at Joso	1-end at 2-yr intervals	4,000 CY (3,058 m^3)	**$244,000**

NOTES:
- Total Costs include Overhead and Profit.
- Escalation and contingencies are not included.
- Item #1--2,000,000 CY (1,529,110 m^3) option--requires a significant amount of Dredging Plant to complete project within construction window. From historical information, this is a high-risk option.
- Dependent on contractor ability to provide equipment that could affect cost.

Points of Contact:
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Estimator - Julie Davin (509) 527-7514